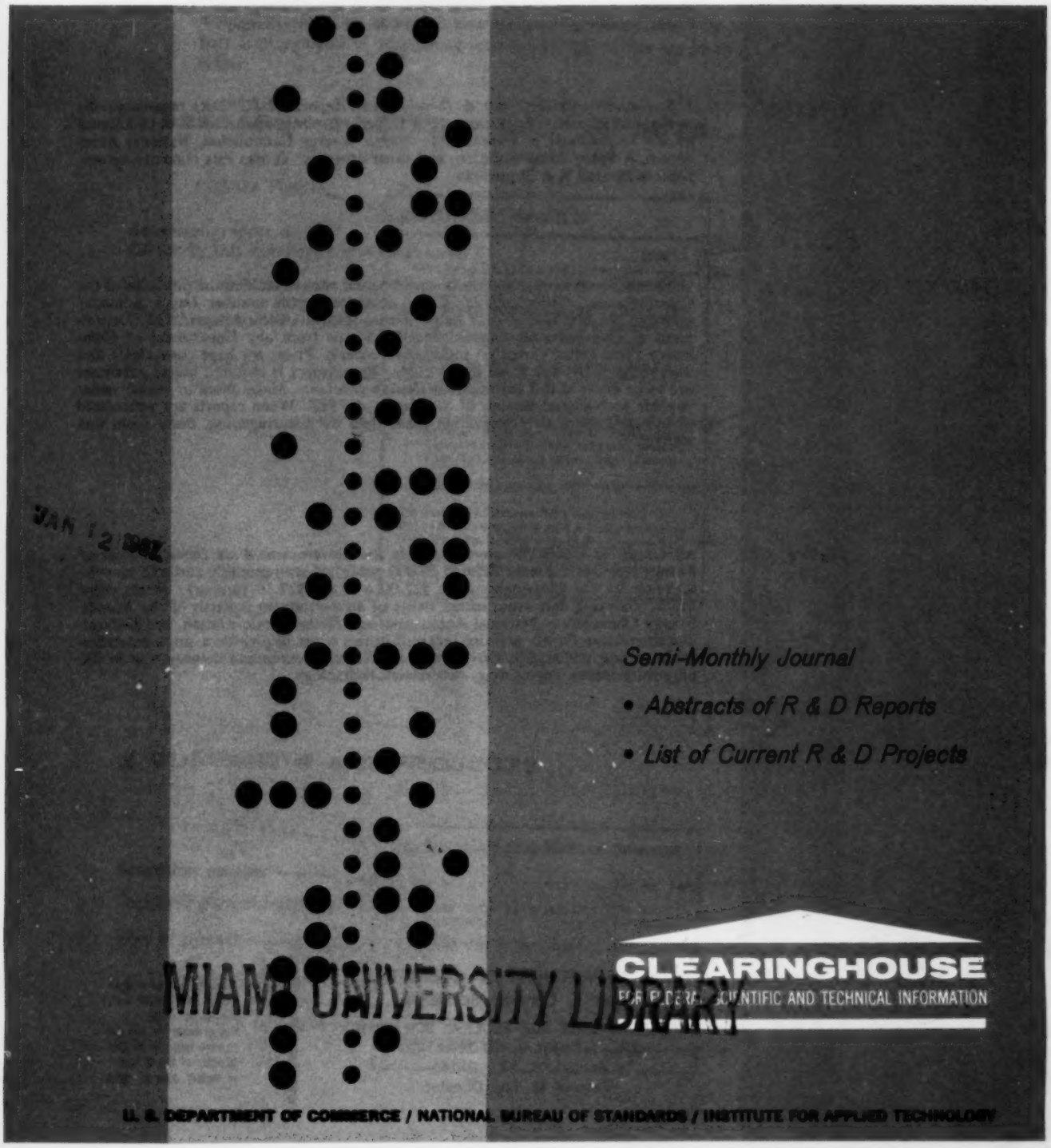
C 41.21 : 41/23

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

December 10, 1966



JAN 12 1967

Semi-Monthly Journal

- *Abstracts of R & D Reports*
- *List of Current R & D Projects*

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U. S. DEPARTMENT OF COMMERCE / NATIONAL BUREAU OF STANDARDS / INSTITUTE FOR APPLIED TECHNOLOGY

December 10, 1966 / Volume 41, Number 23

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

Published semi-monthly by the Clearinghouse for Federal Scientific and Technical Information. Annual subscription $30.00 ($37.50 foreign). Single copy $2.25. Domestic and foreign air mail charges will be quoted on request. Make remittance payable to National Bureau of Standards—CFSTI and mail either to a U.S. Department of Commerce Field Office or to the Clearinghouse, Springfield, Va., 22151. Address changes should be sent to the Clearinghouse.

PURPOSE

U.S. Government Research & Development Reports (USGRDR) announces the availability of selected new reports of U.S. Government-sponsored R & D released by the Department of Defense, the Atomic Energy Commission, National Aeronautics & Space Administration, and other agencies. It also lists current Government-sponsored R & D projects.

TO ORDER REPORTS

With few exceptions, reports announced herein are available to the public from the Clearinghouse. Order reports by the accession/report number (stock number) given on the first line of each entry. Order from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151, or from any Department of Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche (MF) are given in the entry. Prepayment is required unless purchases are to be charged to Clearinghouse deposit accounts. Make check or money order payable to National Bureau of Standards—CFSTI. When reports are announced as available from an organization other than the Clearinghouse, order from that source.

INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $1.75. Indexing data from recent issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

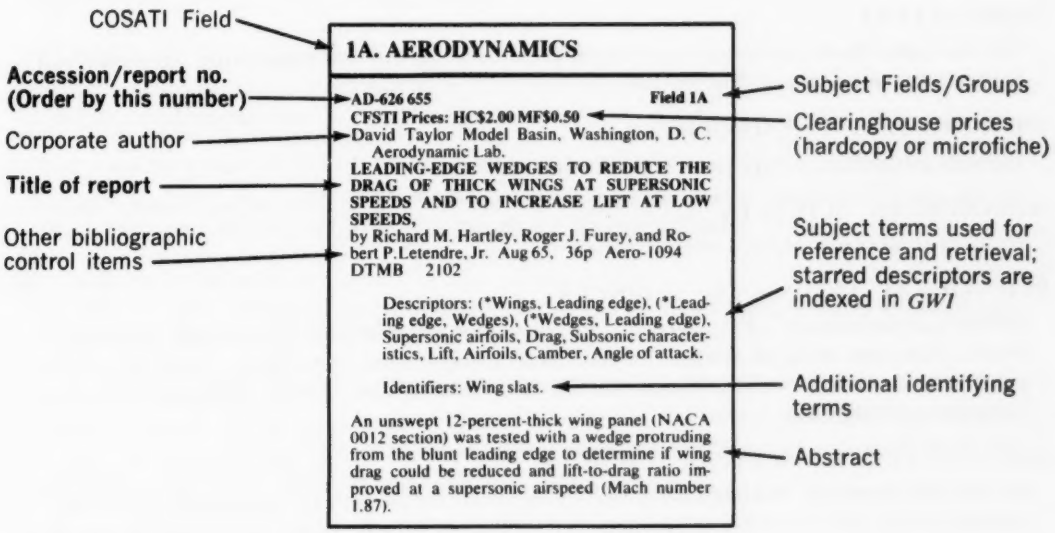
CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated. Use of funds for this publication approved by the Director of the Bureau of Budget, June 22, 1966.

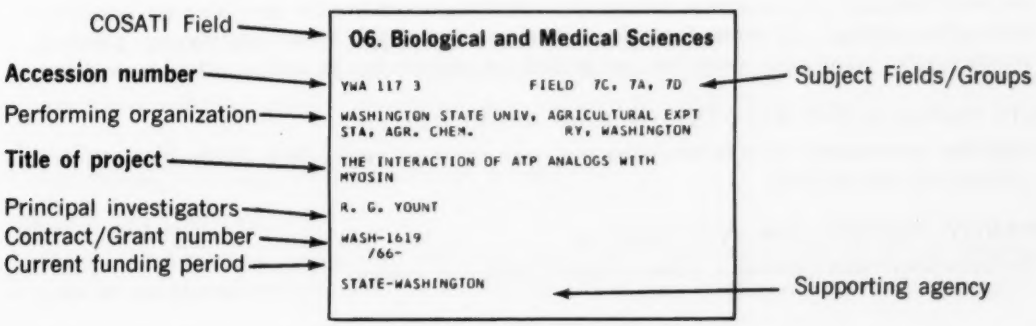
USGRDR FORMAT

Entries are arranged under 22 subject categories called FIELDS. In the entry, subcategories called GROUPS and occasionally sub-groupings are also indicated. This system was adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council on Science and Technology. The COSATI Subject Category List, AD 612 200, is available from the Clearinghouse at $1.00. Documents are listed alphanumerically (that is, alphabetic data precedes numerical data) by accession/report number. Key segments of information contained in the entries are identified diagrammatically below.

● RESEARCH & DEVELOPMENT REPORTS


COSATI Field
1A. AERODYNAMICS
Accession/report no. (Order by this number)
AD-626 655
Field 1A
Subject Fields/Groups
CFSTI Prices: HC$2.00 MF$0.50
Clearinghouse prices (hardcopy or microfiche)
Corporate author
David Taylor Model Basin, Washington, D. C. Aerodynamic Lab.
Title of report
LEADING-EDGE WEDGES TO REDUCE THE DRAG OF THICK WINGS AT SUPERSONIC SPEEDS AND TO INCREASE LIFT AT LOW SPEEDS,
Other bibliographic control items
by Richard M. Hartley, Roger J. Furey, and Robert P.Letendre, Jr. Aug 65, 36p Aero-1094 DTMB 2102
Subject terms used for reference and retrieval; starred descriptors are indexed in GWI
Descriptors: (*Wings, Leading edge), (*Leading edge, Wedges), (*Wedges, Leading edge), Supersonic airfoils, Drag, Subsonic characteristics, Lift, Airfoils, Camber, Angle of attack.
Identifiers: Wing slats.
Additional identifying terms
An unswept 12-percent-thick wing panel (NACA 0012 section) was tested with a wedge protruding from the blunt leading edge to determine if wing drag could be reduced and lift-to-drag ratio improved at a supersonic airspeed (Mach number 1.87).
Abstract

● CURRENT R & D PROJECTS



CONTENTS

Page

Section I RESEARCH HIGHLIGHTS v

Section II RESEARCH & DEVELOPMENT REPORTS 1

Section III CURRENT R & D PROJECTS R-1

SUBJECT CATEGORY HEADINGS

COSATI FIELD

01 AERONAUTICS 1
Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE ..... —
Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 6
Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 13
Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 20
Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 37
Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY 57
Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY 70
Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING 76
Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive) 93
Includes conversion techniques; power sources; and energy storage.

COSATI FIELD

Page

11 MATERIALS 96

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES 105

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING 115

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT 125

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES 129

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY 131

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 132

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY 139

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE 146

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS 147

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS 187

Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY 192

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

special ANNOUNCEMENTS

CURRENT R and D SECTION TO BE DISCONTINUED

The Clearinghouse will suspend publication of the "Current Research and Development Projects" section after the December 25, 1966, issue of USGRDR.

The present concept of publishing information on unclassified research and development in progress is being restudied by the Clearinghouse in an effort to determine the best way for expanding and improving the format for announcement to the industrial and scientific community.

While the study is underway, information on such research can be obtained from the Science Information Exchange of the Smithsonian Institution, where Federal agencies report their new research projects.

REFERENCING ERROR

Due to an error in computer processing, those documents in this issue that should have been referenced to STAR 18 were referenced instead to STAR 17. The NASA document numbers involved range from N66-34120 through N66-32685.

RESEARCH highlights

Reports of current high industrial interest

Categories

	Page No.
Chemical Processing	v
Control Systems and Instrumentation	vi
Information Technology	vi
Metals, Nonferrous and Alloys	vii
Nuclear Technology	viii
Physics	ix
Sanitary Engineering	ix
Semiconductors and Related Materials	xi

Chemical Processing

NUCLEAR POWER PLANTS AND CHEMICAL PRODUCTION

(Order Stock No. BNL-959(T-399) The Impact of Integrated Multipurpose Nuclear Plants on the Chemical and Metallurgical Process Industries: No. 1, Electrochemonuclear Systems, HC $2.00/MF 50 cents.)

The recent development of large-scale nuclear sources of low cost electrical power makes it possible to consider the coupling of nuclear power reactors with efficient electrochemical devices for large-scale production of industrial chemicals, according to Brookhaven National Laboratory. The electrochemonuclear system consists of three basic building blocks: nuclear reactor, dc generator, and electrochemical cell. The electrochemonuclear generation of hydrogen and oxygen is of interest for the fixation of nitrogen for fertilizers, generation of liquid and gaseous carbonaceous fuels, the production of iron and steel, and the

production of liquid hydrogen and oxygen for aircraft and rocket fuel. Based on the speculation that low cost, high pressure water electrolyzers can be developed, estimates of the economics of electrochemonuclear ammonia production relative to conventional fossil-fuel-based plants are presented by BNL as a function of nuclear power costs. For single-purpose plants power costs should be less than 3.7 mills/kwh(e) to compete with coal at $6.50/ton, less than 2.4 mills/kwh(e) to compete with $0.40/MSCF natural gas, and less than 1.7 mills/kwh(e) to compete with $0.30/MSCF. BNL indicates that a desalinated water and fertilizer electrochemonuclear plant appears attractive. A dual-cycle, high temperature radiation and electrochemonuclear reactor offers a highly efficient nitrogen fixation system in the future. BNL also suggests the investigation of utilizing electrochemonuclear oxygen with by-product hydrogen in the steel industry. The realization of these concepts depends on a combination of the development of low cost nuclear power, low investment electrochemical devices, and utilization of by-products.

Control Systems and Instrumentation

NASA REPORT DESCRIBES SPACE VEHICLE INSTRUMENTATION

(Order Stock No. NASA SP-3028 Space Measurements Survey -- Instruments and Spacecraft, HC $6.00/MF $4.25.)

The Space Agency has published a 1000-page work summarizing the characteristics of much of the scientific instrumentation carried in orbital and deep space vehicles in launchings from October 1957 through March 1965. In addition to the United States and Canadian vehicles, available data on the Soviet satellites and spacecraft is included. The first section gives the pertinent characteristics of the spacecraft themselves and is indexed chronologically by launch date and local time for each. The satellite and probe sheets describe the initial orbital parameters, listing the known scientific experiments and instruments. The publication also gives details on the data and power systems as these often affect the scientific data gathered and transmitted to earth. The second section is arranged by instrument type and carries descriptions, drawings, photographs and other material relating to the scientific instruments flown in spacecraft. The third section is a master cross index listing all of the entries in this report by subject, title, and common name.

Information Technology

AEC REVISES DESCRIPTIVE CATALOGING MANUAL

(Order Stock No. TID-4577 (Rev. 2) Descriptive Cataloging Guide, HC $1.00/MF 75 cents.)

This revised manual provides rules for AEC descriptive catalogers which enable them to follow consistently the bibliographic conventions and practices of

the AEC's abstracting and indexing services. It also is valuable to users and potential users of the AEC's printed and machine-readable information services. It can be used by collaborating institutions as an aid in formulating compatible descriptive cataloging practices. It is broader than COSATI's standard in that it embraces material other than Federal scientific and technical reports. Descriptive cataloging information is keyboarded on Friden SPG Flexowriters and is divided into seven distinct types: Reports and Individual Conference Papers, Journal Literature and Book Analytics, Patents, Translations, Non-AEC Unnumbered Conference Papers, Books and Unnumbered Theses, and Engineering Materials Lists.

COSATI REVISES STANDARD FOR DESCRIPTIVE CATALOGING

(Order Stock No. PB-173 314 Standard for Descriptive Cataloging of Government Scientific and Technical Reports, Revision No. 1, October, 1966, HC $1.00/MF 50 cents.)

The First Revision of the Standard for Descriptive Cataloging of Government Scientific and Technical Reports is now available from the Clearinghouse. The standard was originally adopted for Government-wide use in 1963 by the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology. It provides rules which can be used to produce practical uniformity of descriptive cataloging appropriate to the needs of information centers, documentation centers, and the reports departments of libraries. The COSATI publication also provides users with a consistent form of citation and index entries among the products of the various information systems. It enables Government agencies to use the descriptive cataloging entries of others with minimal editorial revision, thereby avoiding costly duplication of effort. Furthermore, it can be a guide to non-Government organizations and institutions who wish to formulate compatible descriptive cataloging practices. The standard sets forth rules governing the form of the essential descriptive cataloging elements such as accession number, corporate author, title, descriptive note, personal author, data and pagination. It covers contract number, report number, availability, supplementary note, and security classification. Elements of information and retrieval not included within its scope are subject category, descriptors, subject headings, identifiers, abstract numbers, classification numbers, and abstracts.

Metals, Nonferrous and Alloys

REDUCING EMBRITTLEMENT OF COBALT-BASED ALLOY

(Order Stock No. NASA TN D-3528 Cold Reduction as a Means of Reducing Embrittlement of a Cobalt-Base Alloy (L-605), HC $2.00/MF 50 cents.)

L-605 cobalt-base alloy has many high-temperature applications, according to metallurgists at the Space Agency's Lewis Research Center. The alloy is

fabricable, weldible, with elevated-temperature strength and oxidation-resistance. This NASA report describes how the effect of prior cold reduction on the room-temperature tensile ductility of L-605 was determined. Prior cold work lessened the embrittling effect of 1600°F exposure and caused increased room-temperature tensile strength and hardness, which were largely maintained even after 1000 hours aging. The nature of the precipitation was changed from that of a preferential intergranular type, as observed in unworked L-605 after aging, to a much more homogeneous type within the grains. This effect was believed to be the primary reason for improved postaging ductility. X-ray diffraction studies confirmed the previously reported precipitation of Co2W and M6C type carbide but showed that prior cold work tended to alter the carbide reaction.

NASA IMPROVES TAZ-8 SUPERALLOY

(Order Stock No. NASA TN D-3597 Investigation of Columbium-Modified NASA TAZ-8 Superalloy, HC $2.00/MF 50 cents.)

A modified TAZ-8 alloy has been found by Lewis Research Center to contain a combination of properties that make it of interest for various aerospace applications. Tagged TAZ-8A, the alloy's high-temperature oxidation resistance, good high-temperature strength, and at least a degree of rollability suggests that it may be useful for surface panels of reentry vehicles, turbojet engine ducting, and formed stator-vane applications. TAZ-8A improves upon TAZ-8 by replacing the vanadium content with columbium and adding small quantities of boron. Its workability potential and high-temperature strength characteristics are generally retained with this change and its oxidation resistance substantially improved. The nominal composition of TAZ-8A in weight percent is 2.5 columbium, 8 tantalum, 6 chromium, 6 aluminum, 4 molybdenum, 4 tungsten, 1 zirconium, 0.125 carbon, 0.004 boron, and the balance nickel. A most critical future study is the consideration of joining techniques for this alloy.

Nuclear Technology

CONFERENCE PAPERS ON PRODUCTION AND USE OF RADIOISOTOPES

(Order Stock Nos. DP-1066, Vol. I, Large Scale Production and Applications of Radioisotopes, HC $7.00/MF $1.75, and DP-1066, Vol. II, Same Title, HC $7.00/MF $1.50.)

The Proceedings of the American Nuclear Society's National Topical Meeting on 'Large-Scale Production and Applications of Radioisotopes' held at Augusta, Ga., March 21-23, 1966 have been published in two volumes. Volume I contains 21 papers by speakers who were invited to discuss subjects in which they are acknowledged experts. The papers discuss production of radioisotopes, chemical processing, international programs, applications of radiation and applications of

isotopic power, all on a large scale. Volume II contains 23 contributed papers which were invited for submission on an international basis. In his introductory remarks to those attending the symposium, the General Chairman, Dr. Gerhard Dessauer, Director of the Physics Section, Savannah River Laboratory, indicated that it is very likely that isotope production and use will develop into a large industry by 1980, if not sooner. Many isotopes will be desired in at least the available quantities for applications in the oceans, on land, and in space, to which they bring unique advantages over alternative sources of power or radiation. 'Meanwhile, efficient production methods must be developed,' said Dr. Dessauer, 'and enough of the candidate materials must be made available in existing production facilities to prove and perfect the devices in which the isotopes are to be used.'

Physics

BROOKHAVEN ISSUES NEUTRON CROSS SECTIONS SUPPLEMENT

(Order Stock No. BNL-325, Second Edition, Suppl. 2, Neutron Cross Sections, Vol. IIA, Z=21 To 40, HC $4.00/MF $1.75.)

A new supplement to Brookhaven National Laboratory's famous 'Barn Book' covers elements 21 through 40 for thermal cross section, resonance parameters, and cross section curves. The publication up-dates information in the BNL-325 Second Edition of 1958 and in Supplement No. 1 of 1960, but supercedes previous issues only when there is new information or new interpretations of old information. Brookhaven suggests the user will be well advised to keep the two previous issues near at hand because a goodly amount of the previous issues is still valid.

Also available:

BNL-325, Second Edition, Suppl. 2, Vol. III, Z=88 To 98,
HC $3.00/MF $1.50,
BNL-325, Second Edition, Suppl. 2, Vol. I, Z=1 To 20,
HC $2.50/MF $1.25.
When Vol. IIB (Z=41-60) and Vol IIC (Z=61-87) are available, the Clearinghouse will announce them. They are scheduled to appear this winter.

Sanitary Engineering

ENVIRONMENTAL HEALTH REPORTS IN CLEARINGHOUSE COLLECTION

The following reports concern air pollution, water pollution, water treatment, and desalination. They were formerly distributed on a limited basis by the Public Health Service of the U. S. Department of Health, Education, and Welfare, but are

now available from the Clearinghouse. The reports give those interested in environmental health a central source of information on the research activities within the Public Health Service, and PHS cooperative activities with State and local agencies, research institutions, and industry.

PB-169 672 Procedures for Determination of Stable Elements and Radionuclides in Environmental Samples, HC $3.00/MF 75 cents;

PB-169 677 Selected Methods for the Measurement of Air Pollutants, HC $3.00/MF 50 cents;

PB-170 475 The Trend of Suspended Particulates in Urban Air: 1957-1964, HC $1.50/MF 50 cents;

PB-170 701 Air Particulates No. 1, HC $1.50/MF 75 cents;

PB-170 744 Air Pollution and the Kraft Pulping Industry, An Annotated Bibliography, HC $4.00/MF 75 cents;

PB-169 671 Factors Influencing Strontium-90 in Milk from the Brainerd, Minn., Milkshed, HC $3.00/MF 75 cents;

PB-169 383 Feasibility of Granular, Activated-Carbon Adsorption for Waste-Water Renovation, HC $2.00/MF 50 cents;

PB-170 741 Evaluation of Various Adsorbents and Coagulants for Waste-Water Renovation, HC $3.00/MF 75 cents;

PB-169 678 Waste Stabilization Pond Study, HC $3.00/MF 50 cents;

PB-169 680 Influence of Impoundments on Water Quality, HC $3.00/MF 75 cents;

PB-169 384 Pollution and the Life in Water, HC $1.60/MF 50 cents;

PB-168 799 Adsorption of Biochemically Resistant Materials From Solution, No. 1, May 1964, HC $3.00/MF 75 cents;

PB-170 700 Adsorption of Biochemically Resistant Materials From Solution, No. 2, Mar. 1966, HC $4.00/MF 75 cents;

PB-170 742 Evaluation of Water Laboratories, HC $3.00/MF 75 cents;

PB-172 455 Water Metals No. 3, HC $4.00/MF $1.00;

PB-169 670 Studies of the Fate of Certain Radionuclides in Estuarine and Other Aquatic Environments, HC $3.00/MF 75 cents;

PB-170 633 Fluoridation Census, HC $2.00/MF 50 cents.

The following selective bibliographies list reports and translations in the Clearinghouse collection:

(SB-448, Rev., Suppl. 1 Air Pollution and Purification, in HC only, $1.00;

SB-498, Suppl. 1 Water Pollution and Water Purification, in HC only, $1.00;

SB-419, Rev., Suppl. 1 Desalination of Water, in HC only, $1.00.)

Semiconductors and Related Materials

AEC LISTS AVAILABLE HIGH-PURITY INORGANIC SOLID-STATE MATERIALS

(Order Stock No. ORNL-RMIC-5 Lists of Available and Desired Materials and Available Crystal-Growth References (Ultrapure Inorganic Research Materials), HC $3.00/MF 50 cents.)

The Research Materials Information Center of AEC's Oak Ridge National Laboratory has published lists of high-purity inorganic solid-state research materials known to be available, materials for which the RMIC can provide references on crystal growth, and materials about which information has been requested from the RMIC and for which no source could be found. In several ways, the list of available materials is more selective than earlier lists published. Individual materials are represented in less variety; only the highest purity and largest size is given for each material. RMIC notes that it should be assumed that for many of the materials shown, lower purities and other forms are available.

NEW BIBLIOGRAPHY ON SEMICONDUCTORS

(Order Stock No. SB-534, Suppl. 1, Semiconductors, in HC only, $1.00.)

A 68-page selective bibliography compiled by the Clearinghouse lists 1334 domestic and foreign references added to the collection from October 1960 through April 1966. Categories of RDT and E include organic semiconductors, high temperature, noise, radiation damage, surface effects, solid state devices, thin film, applications, thermoelectric materials, materials and properties, translations, and patents.

RESEARCH & DEVELOPMENT REPORTS

1A. AERODYNAMICS

AD-427 050 **Field 1A**
CFSTI Price: HC$4.60
GM Defense Research Labs., Santa Barbara, Calif.
A BROAD SURVEY OF FREE-FLIGHT RANGE MEASUREMENTS FROM THE FLOW ABOUT SPHERES AND CONES,
by R. I. Primich. Sep 63, 45p Technical rept. TR-63-224
Contract DA-04-495-ORD-3567, ARPA Order-347-63

Descriptors: (*Hypersonic flight, Instrumentation), (*Atmosphere entry, Simulation), Guided missile detection, Measurement, Spheres, Cylindrical bodies, Conical bodies, Gas ionization, Radar echo areas, Wake, Infrared radiation, Schlieren photography, Scattering, Ablation, Radiometers, Test facilities, Microwaves, Doppler radar, Continuous wave radar, Blunt bodies, Slender bodies, Electron density, Models (Simulations), High-speed cameras, Turbulence, Hypersonic flow, Optical phenomena, Infrared phenomena.

Free-flight measurements of the flow about both non-ablating and ablating spheres, sphere-capped cylinders, and cones are reported. Included are radiometer measurements in the 0.2-5.5 micron band, image converter and schlieren photographs, microwave measurements of wake ionization, head-on radar cross-section measurements, backscatter radar cross-section measurements of turbulent trails, and measurements of precursor ionization. Radiation results for non-ablating spheres, the effect of contaminants, and a comparison between sphere and cone results are presented. The status of the head-on radar results which include anomalous absorption is discussed. Precursor ionization ahead of non-ablating spheres was identified and attributed to photoionization. Comparative results of both schlieren and radar systems, which involve transition from laminar to turbulent flow and scattering from turbulent wakes are outlined. For cones, conditions cover velocities up to 22,000 ft/sec and pressures up to 150 mm hg, while for spheres, velocities range up to 24,000 ft/sec and pressures up to 300 mm hg. (Author)

AD-640 945 **Field 1A, 1C**
CFSTI Prices: HC$4.00 MF$0.75
Princeton Univ., N. J. Dept. of Aerospace and Mechanical Sciences.
AN ANALYTICAL STUDY OF FACTORS INFLUENCING THE LONGITUDINAL STABILITY OF TILT-WING VTOL AIRCRAFT,
by G. Beppu, and H. C. Curtiss Jr. Jul 66, 108p
Rept. no. 756
Contract DA-44-177-AMC-8 (T)
Proj. DA-1P125901A14233
USAAVLABS-TR-66-53

Descriptors: (*Vertical take-off planes, Pitch (Motion)), Stability, Analysis, Tilt wings, Hovering, Transport planes.

Identifiers: C-142 aircraft.

An analytical method for predicting the stability characteristics of tilt-wing VTOL aircraft in the transition speed range is presented. Sample calculations based on an assumed tilt-wing VTOL transport configuration of the XC-142A class with double slotted flaps are given. Particular emphasis is placed on the sensitivity of the results to various assumptions made in the analysis. The contributions of the various aircraft components and the aerodynamic interactions of the components to the stability derivatives are discussed, as well as the changes in the characteristic modes of motion of the vehicle that result from variations in the stability derivatives. The trim conditions of the vehicle are shown to be quite sensitive to the prediction of the flap characteristics. A limited comparison of the calculated results with experimental data obtained from a dynamic model of the XC-142A, which is somewhat dissimilar from the assumed configuration, is presented. This comparison indicates that the trends of the stability derivatives are correctly predicted. The agreement between theory and experiment is good in hovering; however, as the wing incidence is reduced, the difference between theory and experiment becomes quite large. (Author)

N66-30346 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FIN - A COMPUTER PROGRAM FOR CALCULATING THE AERODYNAMIC CHARACTERISTICS OF FINS AT SUPERSONIC SPEEDS.
by J. S. Barrowman. Apr 66, 45p NASA-TM-X-55523, X-721-66-162

Descriptors: *Aerodynamic characteristics, *Computer program, *Fin, *Supersonic speed, Aerodynamic, Characteristic, Coefficient, Computer, Configuration, Drag, Lift, Moment, Pitch, Pressure, Program, Speed, Supersonic, Wave, Wind tunnel.

For abstract, see STAR 04 17.

N66-30852 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
Wyle Labs., Inc., Huntsville, Ala.
AERODYNAMIC NOISE RESEARCH SUPPORT QUARTERLY PROGRESS REPORT, JAN. - MAR. 1966.
by M. V. Lowson. 8 Apr 66, 7p NASA-CR-76358
Contract NAS8-11308

Descriptors: *Aerodynamic noise, *Flow visualization, *Separated flow, *Turbulent flow, Acoustic, Aerodynamic, Environment, Flow, Fluctuation, Noise, Oscillation, Pressure, Separation, Shock, Subsonic, Supersonic, Surface, Turbulent, Visualization.

For abstract, see STAR 04 17.

N66-31208 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
FLUTTER STUDIES OF SIMPLIFIED COMPONENT MODELS OF A VARIABLE-SWEEP-WING AIRPLANE AT MACH NUMBERS UP TO 3.0.
by I. Abel, C. L. Ruhlin, and M. C. Sanford. Jul 66, 45p NASA-TN-D-3501

Descriptors: *Flutter analysis, *Supersonic wind tunnel, *Sweptback wing, *Variable sweep, Analysis, Angle, Boundary, Component, Flutter, Horizontal, Mach number, Model, Speed, Supersonic, Sweep, Sweepback, Tail, Transonic, Tunnel, Variable, Vehicle, Wind, Wing.

For abstract, see STAR 04 17.

N66-31859 **Field 1A**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
LOW-SPEED TESTS OF 50 DEG-SWEPT PARAWINGS APPLIED TO A 0.17-SCALE MODEL OF A MANNED FLIGHT VEHICLE.
by F. M. Bugg. Aug 66, 54p NASA-TN-D-3493

Descriptors: *Flight vehicle, *Low speed wind tunnel, *Swept wing, Characteristics, Control, Drag, Flight, Lift, Low speed, Manned, Performance, Ratio, Sweep, Test, Tunnel, Vehicle, Wind.

For abstract, see STAR 04 17.

N66-31943 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
PRESSURE MEASUREMENTS ON RIGID MODEL OF BALLUTE DECELERATOR AT MACH NUMBERS FROM 0.56 TO 1.96.
by R. A. Turk. Aug 66, 16p NASA-TN-D-3545

Descriptors: *Ballute, *Decelerator, *Pressure measurement, *Rigid structure, *Transonic wind tunnel, Drag, Mach number, Measurement, Model, Pressure, Reynolds number, Rigid, Structure, Transonic, Tunnel, Wake, Wind.

For abstract, see STAR 04 17.

N66-32226 **Field 1A**
CFSTI Prices HC$5.29 MF$2.25
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
MEETING ON GROUND WIND LOAD PROBLEMS IN RELATION TO LAUNCH VEHICLES.
1966, 479p NASA-TM-X-57779
Meeting Held At Langley Res. Center, 7-8 Jun. 1966

Descriptors: *Aerodynamic load, *Circular cylinder, *Conference, *Ground effect, *Launch vehicle, *Wind effect, Aerodynamic, Circular, Cylinder, Drag, Effect, Equipment, Flow, Force, Ground, Lift, Load, Oscillation, Rigid, Simulation, Structure, Support, Tunnel, Unsteady, Vibration, Wind.

For abstract, see STAR 04 17.

N66-32327 **Field 1A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
NEWTONIAN AERODYNAMIC CHARACTERISTICS OF BLUNTED RIGHT ELLIPTICAL CONES FOR CONE THICKNESS RATIOS OF 0.25 TO 3.
by R. E. Graham, R. H. Lamb, and P. O. Romere. Aug 66, 74p NASA-TN-D-3462

Descriptors: *Aerodynamic characteristics, *Blunt body, *Cone, *Directional stability, *Longitudinal stability, Aerodynamic, Blunt, Body, Characteristics, Coefficient, Cross section, Direction, Ellipticity, Equation, Force, Longitudinal, Moment, Ratio, Stability, Static, Thickness.

For abstract, see STAR 04 17.

N66-32624 **Field 1A**
CFSTI Prices HC$3.75 MF$1.50
Boeing Co., Renton, Wash. Airplane Div.
LARGE TRANSPORT LANDING CHARACTERISTICS AS SIMULATED IN FLIGHT AND ON THE GROUND.
by J. W. Kerrigan, and R. G. Root. 1966, 241p NASA-CR-62036, D6-15000
Contract NAS2-3224

Descriptors: *Landing simulation, *Low speed stability, *Transport aircraft, Aircraft, Base, Boeing military aircraft, Calculation, Characteristics, Comparison, Control, Landing, Large, Low speed, Motion, Simulation, Stability, Theory, Transport.

For abstract, see STAR 04 17.

N66-32681 **Field 1A**
CFSTI Prices HC$2.50 MF$0.75
Lockheed Missiles And Space Co., Sunnyvale, Calif.
DYNAMICS OF SEPARATED FLOW OVER BLUNT BODIES TECHNICAL SUMMARY REPORT.
by L. E. Ericsson, and J. P. Reding. Dec 65, 87p NASA-CR-76912
Contract NAS8-5338
Its Rept.-2-80-65-1

Descriptors: *Blunt body, *Dynamic property, *Flow separation, *Static loading, Aerody-

namic, Blunt, Body, Damping, Dynamic, Elastic, Experiment, Flow, Geometry, Instability, Loading, Model, Property, Quasi-steady, Saturn i launch vehicle, Separation, Static, Trajectory, Transonic.

For abstract, see STAR 04 17.

N66-37043 Field 1A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
A QUASI-THREE-DIMENSIONAL METHOD FOR CALCULATING BLADE SURFACE VELOCITIES FOR AN AXIAL FLOW TURBINE BLADE.
by L. T. Dellner, and T. Katsanis. 1966, 42p NASA-TM-X-52234

Descriptors: *Axial flow, *Turbine blade, *Velocity distribution, Aerodynamic, Analysis, Axial, Blade, Calculation, Compressible, Design, Dimensional, Distribution, Flow, Method, Surface, Three, Turbine, Velocity.

For abstract, see STAR 04 22.

N66-37114 Field 1A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
FLUTTER TESTS OF SOME SIMPLE MODELS AT A MACH NUMBER OF 7.2 IN HELIUM FLOW.
by R. W. Miller, and H. G. Morgan. Apr 59, 29p NASA-MEMO-4-8-59L

Descriptors: *Airfoil characteristics, *Flutter analysis, *Hypersonic flow, Aeroelasticity, Airfoil, Analysis, Characteristics, Double, Flat, Flow, Flutter, Helium, Hypersonic, Model, Plate, Rectangle, Scale, Test, Thickness, Wedge.

For abstract, see STAR 04 22.

N66-37116 Field 1A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
TRANSONIC FLUTTER INVESTIGATION OF MODELS OF THE SWEPTBACK WING OF A FIGHTER AIRPLANE.
by R. W. Boswinkle Jr, and S. L. Smith III. 15 Apr 58, 31p NACA-RM-L58A15

Descriptors: *Fighter aircraft, *Sweptback wing, *Transonic flutter, Aeroelasticity, Aircraft, Characteristics, Fighter, Flutter, Model, Scale, Stream, Sweepback, Transonic, Turbulence, Wing.

For abstract, see STAR 04 22.

N66-37151 Field 1A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AERODYNAMIC-CENTER CONSIDERATIONS OF WINGS AND WING-BODY COMBINATIONS.
by W. J. Alford Jr, and J. E. Lamar. Oct 66, 15p NASA-TN-D-3581
Contract 126-13-03-22-23

Descriptors: *Aerodynamic load, *Supersonic speed, *Wing body, Aerodynamics, Body, Center, Combination, Load, Mach number, Rigidity, Shift, Speed, Subsonic, Supersonic, Wing.

For abstract, see STAR 04 22.

N66-37152 Field 1A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
CONSIDERATIONS REGARDING THE EVALUATION AND REDUCTION OF SUPERSONIC SKIN FRICTION.
by W. J. Monta, and J. B. Peterson Jr. Oct 66, 20p NASA-TN-D-3588, NASA-SP-124
Contract 126-13-03-22-23
Presented At The Conf. On Aircraft Aerodyn., Langley Res. Center, 23-25 May 1966 Also Published In Nasa-sp-124, See X66-20041 17-01

Descriptors: *Skin friction drag, *Supersonic transport, *Turbulent boundary layer, Aerodynamics, Boundary, Configuration, Data, Drag, Experiment, Friction, Layer, Prediction, Skin, Supersonic, Transport, Turbulence.

For abstract, see STAR 04 22.

N66-37284 Field 1A
CFSTI Prices HC$1.00 MF$0.50
Wyle Labs., Inc., Huntsville, Ala.
SUPERSONIC TURBULENT SEPARATION TESTS IN THE MARSHALL SPACE FLIGHT CENTER 7 IN TUNNEL.
by M. V. Lowson. 1965, 18p NASA-CR-78284, TM-65-4
Contract NAS8-11308

Descriptors: *Flow separation, *Supersonic wind tunnel, *Test program, *Turbulent flow, Acoustic, Boundary, Environment, Flow, Layer, Model, Program, Separation, Shadowgraph, Supersonic, Test, Thickness, Tunnel, Turbulent, Wind.

For abstract, see STAR 04 22.

N66-37296 Field 1A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ANALYSIS OF THE LINEARIZED SUPERSONIC FLOW ABOUT POINTED BODIES OF REVOLUTION BY THE METHOD OF CHARACTERISTICS.
by A. D. Sherer. Oct 66, 48p NASA-TN-D-3578

Descriptors: *Body of revolution, *Characteristic method, *Supersonic flow, Angle of attack, Body, Characteristic, Equation, Field, Flow, Linear, Method, Point, Potential, Revolution, Supersonic.

For abstract, see STAR 04 22.

N66-37297 Field 1A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
WIND-TUNNEL-FLIGHT CORRELATION OF SHOCK-INDUCED SEPARATED FLOW.
by D. L. Loving. Sep 66, 11p NASA-TN-D-3580, NASA-SP-124
Contract 126-13-03-22-23
Presented At Conf. On Aircraft Aerodyn. Langley Station, Va., 23-25 May 1966 Also Published In Nasa-sp-124, See X66-20041 17-01

Descriptors: *Flight test, *Separated flow, *Wind tunnel, Boundary, Drag, Flight, Flow, Layer, Lift, Load, Prediction, Separation, Supercritical, Test, Tunnel, Wind.

For abstract, see STAR 04 22.

N66-37300 Field 1A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECT OF WING LEADING-EDGE SHAPE ON AERODYNAMIC CHARACTERISTICS OF A 67 DEG SWEPT WING-BODY MODEL AT MACH 1.50 TO 4.63.
by M. O. Feryn, and R. G. Kyle. Oct 66, 28p NASA-TN-D-3634

Descriptors: *Aerodynamic characteristics, *Leading edge, *Supersonic speed, *Swept wing, Aerodynamic, Bluntness, Characteristics, Dihedral, Edge, Leading, Model, Shape, Speed, Stability, Supersonic, Sweep, Wing.

For abstract, see STAR 04 22.

N66-37301 Field 1A
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
HEAT-TRANSFER AND PRESSURE DISTRIBUTIONS ON 60 DEG AND 70 DEG SWEPT DELTA WINGS HAVING TURBULENT BOUNDARY LAYERS.
by W. M. Murray Jr, and R. L. Stallings Jr. Oct 66, 76p NASA-TN-D-3644
Contract 126-13-02-10-23

Descriptors: *Delta wing, *Heat transfer, *Pressure distribution, *Swept wing, *Turbulent boundary layer, Boundary, Delta, Distribution, Edge, Flat, Layer, Leading, Model, Plate, Pressure, Sweep, Theory, Tunnel, Turbulent, Wind, Wing.

For abstract, see STAR 04 22.

N66-37307 Field 1A
CFSTI Prices HC$2.00 MF$0.50
Rice Univ., Houston, Tex.
BODIES OF MAXIMUM LIFT-TO-DRAG RATIO IN HYPERSONIC FLOW.
by A. H. Lusty Jr, and A. Miele. 1966, 39p NASA-CR-78247, AAR-22
Contract NGR-44-006-034

Descriptors: *Hypersonic flow, *Lift-drag ratio, *Variational calculus, Body, Cross section, Distribution, Friction, Maximum, Pressure, Semicircular, Skin, Slender.

For abstract, see STAR 04 22.

N66-37418 Field 1A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
STUDIES OF VARIOUS FACTORS AFFECTING DRAG DUE TO LIFT AT SUBSONIC SPEEDS.
by W. P. Henderson. Oct 66, 16p NASA-TN-D-3584
Contract 126-13-03-22-23

Descriptors: *Drag, *Lift, *Subsonic speed, *Swept wing, *Thin wing, Edge, Leading, Mach number, Reynolds number, Speed, Subsonic, Sweep, Thin, Wing.

For abstract, see STAR 04 22.

N66-37591 Field 1A
CFSTI Prices HC$2.00 MF$0.50
Institut Franco-allemand De Recherches, St. Louis (France).
ON THE EFFECT OF SPIKES ATTACHED IN FRONT OF AN ENGINE IN SUBSONIC SPEEDS.
Ueber Die Wirkung Von Einem Flugkoerper Vorgeschalten Spiessen (Spikes) Im Unterschall
by R. Ramshorn. 16 Jul 66, 30p ISL-T-24/65
In German

Descriptors: *Spike nozzle, *Stability and control, *Wing body, Aerodynamics, Angle, Effect, Incidence, Length, Nose, Subsonic, Thickness.

For abstract, see STAR 04 22.

AD-641 246 See Field 1C

1B. AERONAUTICS

N66-30081 Field 1B
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.

GROUND MEASUREMENTS OF SHOCK-WAVE PRESSURE FOR FIGHTER AIRPLANES FLYING AT VERY LOW ALTITUDES AND COMMENTS ON ASSOCIATED RESPONSE PHENOMENA.
by V. Huckel, D. J. Maglieri, and T. L. Parrott.
Jul 66, 72p NASA-TN-D-3443

Descriptors: *Fighter aircraft, *Ground effect, *Shock wave propagation, *Supersonic flight, Aircraft, Bow, Break, Damage, Data, Effect, Fighter, Flight, Glass, Ground, History, Low altitude, Measurement, Pressure, Rise, Shock, Supersonic, Theoretical, Time, Wave, Window.

For abstract, see STAR 04 17.

N66-30177 **Field 1B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
ANALYSIS OF BOUNDARY-LAYER TRANSITION ON X-152-2 RESEARCH AIRPLANE.
by A. L. Braslow. Jul 66, 18p NASA-TN-D-3487

Descriptors: *Boundary layer transition, *Surface roughness, *Thermocouple, *X- 15 aircraft, Boundary, Data, Flight, Flow, Fuselage, Joint, Laminar, Layer, Roughness, Sensor, Skin, Surface, Transition, Turbulent, Wing.

For abstract, see STAR 04 17.

N66-31209 **Field 1B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
GROUND-RUN TESTS WITH A BOGIE LANDING GEAR IN WATER AND SLUSH.
by R. C. Dreher, and W. B. Horne. Jul 66, 50p
NASA-TN-D-3515

Descriptors: *Ground test, *Landing gear, *Runway condition, *Water landing, Aircraft, Condition, Displacement, Drag, Flap, Fluid, Gear, Ground, Landing, Runway, Simulation, Slush, Spin, Spray, Test, Water, Wing.

For abstract, see STAR 04 17.

N66-31210 **Field 1B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EXPERIMENTS ON THE EFFECTS OF ATMOSPHERIC REFRACTION AND AIRPLANE ACCELERATIONS ON SONIC-BOOM GROUND-PRESSURE PATTERNS.
by D. A. Hilton, and D. J. Maglieri. Jul 66, 33p
NASA-TN-D-3520

Descriptors: *Atmospheric refraction, *Pressure distribution, *Sonic boom, *Supersonic aircraft, Acceleration, Atmospheric, Boom, Distribution, Effect, Fighter, Ground, High altitude, Measurement, Multiple, N wave, Pattern, Pressure, Refraction, Shock, Sonic, Wave.

For abstract, see STAR 04 17.

N66-31742 **Field 1B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
ANALYTICAL STUDIES OF THE RESPONSE TO LONGITUDINAL CONTROL OF THREE AIRPLANE CONFIGURATIONS IN LANDING APPROACHES.
by W. Bihrle Jr, and R. W. Stone Jr. 9 Apr 53, 50p
NACA-RM-L53B10

Descriptors: *Aircraft carrier, *Approach and landing, *Longitudinal control, Aircraft, Approach, Carrier, Configuration, Control, Dynamic, Horizontal, Landing, Longitudinal, Low aspect, Ratio, Sweep, Tail, Wing.

For abstract, see STAR 04 17.

N66-31853 **Field 1B**
CFSTI Prices HC$3.75 MF$1.25
Boeing Co., Renton, Wash. Airplane Div.
367-80 AIRPLANE VARIABLE STABILITY SIMULATION SYSTEM (NASA LANGLEY SUPERSONIC TRANSPORT SIMULATION PROGRAM).
by S. D. Person, and R. E. Robbins. 1965, 228p
NASA-CR-66126, D6-19856
Contract NAS1-4096

Descriptors: *Flight simulator, *Jet aircraft, *Stability and control, *Supersonic aircraft, Aircraft, Boeing 707 aircraft, Computer, Control, Engine, Flight, Four, Hardware, Jet, Operation, Power, Prototype, Simulator, Stability, Supersonic, Variable.

For abstract, see STAR 04 17.

N66-31854 **Field 1B**
CFSTI Prices HC$3.75 MF$1.25
Boeing Co., Renton, Wash. Airplane Div.
SIMULATION OF THREE SUPERSONIC TRANSPORT CONFIGURATIONS WITH THE BOEING 367-80 IN-FLIGHT DYNAMIC SIMULATION AIRPLANE.
by P. M. Condit, W. M. Eldridge, R. C. Schwanz, and C. R. Taylor. 1966, 234p NASA-CR-66125, D6-10743
Contract NAS1-4096

Descriptors: *Approach and landing, *Flight simulator, *Low speed stability, *Supersonic transport, Aircraft, Approach, Augmentation, Configuration, Delta, Dynamic, Flight, Geometry, Landing, Longitudinal, Low speed, Simulator, Stability, Supersonic, Sweep, Transport, Variable.

For abstract, see STAR 04 17.

N66-32111 **Field 1B**
CFSTI Prices HC$3.00 MF$0.75
Technology, Inc., Dayton, Ohio.
A STATISTICAL MODEL FOR APPLICATION OF MANEUVER FLIGHT LOADS DATA TO STRUCTURAL DESIGN CRITERIA.
by A. P. Berens, L. E. Clay, and F. J. Giessler.
Aug 65, 102p NASA-CR-76426
Contract NASW-970
Its Rept.-970-65-4

Descriptors: *Aircraft structure, *Flight load recorder, Aircraft, Design, F-105 aircraft, Flight, Load, Maneuver, Model, Peak, Recorder, Shear, Statistical, Structure.

For abstract, see STAR 04 17.

N66-32326 **Field 1B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Flight Research Center, Edwards, Calif.
A PARAMETRIC STUDY OF FACTORS INFLUENCING THE DEEP-STALL PITCH-UP CHARACTERISTICS OF T-TAIL TRANSPORT AIRCRAFT.
by B. G. Powers. Aug 66, 28p NASA-TN-D-3370

Descriptors: *Computer program, *Pitching moment, *Stalling, *Transport aircraft, Aircraft, Analog, Computer, Effect, Moment, Parameter, Pitch, Program, T shape, Tail, Transport.

For abstract, see STAR 04 17.

AD-237 155 **See Field 17G**

AD-640 601 **See Field 17G**

AD-640 604 **See Field 17G**

AD-640 605 **See Field 17G**

AD-640 666 **See Field 19D**

AD-640 971 **See Field 5E**

AD-641 174 **See Field 4A**

1C. AIRCRAFT

AD-449 922 **Field 1C**
CFSTI Price: HC$7.60
Stencel Aero Engineering Corp., Asheville, N. C.
A4D-MS-UPP ESCAPE SYSTEM HARDWARE DEVELOPMENT.
Final engineering rept., 16 Apr 62-30 Jun 64.
30 Jun 64, 76p
Contract NOw-62-0587-c

Descriptors: (*Ejection seats, Jet bombers), (*Attack bombers, Ejection seats), (*Jet training planes, Ejection seats), Naval aircraft, Aviation safety, Design, Construction, Safety harness, Parachutes, Parachute descents, Pneumatic devices, Gas generating systems, Release mechanisms, Flight testing, Operation, Reliability, Acceptability, Model tests, Life rafts, Inflatable structures.

A prototype hardware and equipment design, development, and fabrication program was performed to provide elements adaptable for use in the T2J and A4D ejection seat escape systems, under contract NOw 62-0587-c. Contractual change-of-specifications provided for inclusion of the LS-1 UPP (ballistic parachute); a cool gas generator for pararaft inflation; ballistically-actuated take-up reels on the restraint harness; and, a ballistic parachute-canopy release actuator. System flight-testing verified the system's reliability and proper operation of the time-sequencing train. Recommendations are made for a follow-on study program to optimize overall System Performance. (Author)

AD-640 678 **Field 1C, 14A**
CFSTI Prices: HC$2.00 MF$0.50
Federal Aviation Agency, Washington, D. C. Economics Div.
DIRECT OPERATING COSTS AND OTHER PERFORMANCE CHARACTERISTICS OF TRANSPORT AIRCRAFT IN AIRLINE SERVICE FOR CALENDAR YEAR 1965.
Sep 66, 33p

Descriptors: (*Transport planes, Costs), (*Commercial planes, Costs), Operation, Helicopters, Jet transport planes, Turboprop engines, Performance (Engineering), Flight crews, Flight speeds, Maintenance, Aircraft seats, Fuel consumption, Civil aviation, Statistical data.

The report describes measures of aircraft performance and direct operating costs achieved in recent airline service. It is designed specifically to show, for the various types of airline aircraft, data on utilization, seating capacities, speeds, fuel consumption, and average stage lengths as well as on direct operating costs and the elements thereof.

AD-640 891 **Field 1C, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Army Natick Labs., Mass. Pioneering Research Div.
HUMAN FACTORS REQUIREMENTS FOR THE DESIGN OF HELICOPTER AIRCREWMEN'S SEAT AND GROIN PROTECTIVE UNITS.
Technical rept.,
by Richard L. Burse. Sep 66, 15p EPR-11
Proj. DA-1C024701A121-02
USA-NLABS-TR-67-28-PR

Descriptors: (*Aircraft seats, Human engineering), (*Helicopters, Aircraft seats),

Flight crews, Body armor, Design, Fatigue (Physiology), Aviation safety.

The most important human factors requirements for the design of rigidly armored seat and groin protective units for the seated helicopter aircrewmen are discussed. Included are requirements for preventing interference with mission performance, reducing fatigue and providing a compatible, safe and somewhat comfortable working environment for the fully-equipped aircrewman. Quantitative design criteria for dimensions, contours, cushioning and location of the seat and groin protective units are specified. (Author)

AD-640 946 **Field 1C**
CFSTI Prices: HC$7.00 MF$1.50
Lockheed-California Co., Burbank.
PARAMETRIC ANALYSIS AND PRELIMINARY DESIGN OF A SHAFT-DRIVEN ROTOR SYSTEM FOR A HEAVY-LIFT HELICOPTER.
Final rept.,
by Vahe Bilezikjian, James M. Brye, Harry M. Childers, William J. Conway, and Harry D. Goldstein. Aug 66, 328p LR-19143
Contract DA-44-177-AMC-276 (T)
Proj. DA-1F131001D157
USAAVLABS-TR-66-48

Descriptors: (*Helicopter rotors, Design), Lift, Drive shafts, Loading (Mechanics), Transport planes, Weight, Aeroelasticity, Analysis, Stability, Configuration.

A parametric analysis and a preliminary design study were conducted to determine the optimum characteristics of a shaft-driven rotor which would result in the lightest gross weight helicopter capable of lifting military loads in the 12- to 20-ton range. The study considered single- and tandem-rotor helicopters with internal cargo and cargo pod. Types of rotors analyzed were articulated, teetered, rigid, and matched-stiffness. Existing turbine engines or growth versions thereof were considered. Component weight equations were developed and a computer program was utilized to determine the rotor characteristics for each helicopter configuration. For a given set of rotor parameters, the program computed the power plant rating, fuel required, and the empty weight corresponding to the helicopter which would satisfy the most critical mission requirements with the minimum gross weight. The performance of the resulting configuration was determined. Design studies of the rotor system, rotor controls, rotor/propulsion arrangement, and the general arrangement were made. Rotor loads were developed and a structural design analysis of the rotor system, including fatigue and weight analyses, was prepared. A dynamic and aeroelastic investigation of the rotor system and a stability and control study of the helicopter were conducted. The study indicates that the single-rotor helicopter incorporating a matched-stiffness rotor system would have a gross weight of 62,500 pounds for 12-ton payload range and 74,727 pounds for the 20-ton payload range. These gross weights are 4- to 6-percent less than the other configurations studied. (Author)

AD-640 987 **Field 1C**
CFSTI Prices: HC$4.00 MF$0.75
Ryan Aeronautical Co., San Diego, Calif.
FLEXIBLE WING LIGHT UTILITY GLIDER.
Final rept.,
by N. Sakamoto, and G. Cota. Aug 66, 118p
Rept. no. 64B139
Contract DA-44-177-AMC-209 (T)
Task LP121401A14172
USAAVLABS-TR-66-2

Descriptors: (*Gliders, *Utility planes), Wings, Flexible structures, Flight testing, Cargo, Towed planes, Aerodynamic characteristics.

Presented in the report are the results of a flight test program of a towed light utility glider system. The system was designed to carry odd-geometry cargo, and demonstrated towed flight operations up to the maximum design weight of 1500 pounds, at a velocity range extending from 30 to 70 knots indicated airspeed. Testing also included takeoff and landings on tow with helicopters, and evaluation of the flight homing system. Free flights of the light utility glider were also made carrying a payload of 800 pounds. Presented also are the system description, and an aerodynamic and structural analysis. (Author)

AD-640 988 **Field 1C**
CFSTI Prices: HC$5.00 MF$1.25
Aerophysics Co., Washington, D. C.
INVESTIGATION OF LIGHTWEIGHT STRUCTURAL DESIGN TECHNIQUES FOR LIGHT WEIGHT FANS,
by Gabriel D. Boehler, William F. Foshag, Edward Deutsch, and John A. Balciunas. Sep 66, 145p
Contract DA-44-177-AMC-250 (T)
Proj. DA-1P125 901A142
USAAVLABS-TR-66-60

Descriptors: (*Ground effect machines, *Fans), Design, Weight, Structural properties, Diffusers, Lift, Stresses, Tests, Aluminum.

The results of an investigation of the design and fabrication problems of a minimum-weight rotating-diffuser lift system for an air cushion vehicle (ACV) are presented. A numerical method for the stress analysis of an indeterminate rotating diffuser centrifugal fan structure was reduced to practice and programmed for the IBM 1620 computer. This method was used as a tool for the analytical design of a minimum-weight RD fan. This fan, with a 64.5-inch overall diameter, was built of aluminum and was structurally tested. Stress levels throughout the fan were measured by means of 21 strain gages. Results of the tests are very encouraging and vindicate the analytical approach to fan design. Based on measured weights and stress levels, it is concluded that RD fans for ACV applications, for ratings between 100 and 1000 horsepower, can be built for 0.5 pound per horsepower. (Author)

AD-641 030 **Field 1C**
CFSTI Prices: HC$2.00 MF$0.50
Hughes Tools Co., Culver City, Calif. Aircraft Div.
INVESTIGATION OF GENERALIZED METHODS FOR USE OF EXCITATION PANELS TO PRODUCE HELICOPTER ROTOR BLADE FLIGHT FATIGUE LOADS DURING WHIRL TEST.
Final rept., 14 Jan 65-14 Apr 66,
by J. D. Eakin, and K. B. Amer. 16 Aug 66, 50p
HTC-AD-66-7
Contract N156-46217
Proj. PA-1-23-4R
NAEC-ASL-1100

Descriptors: (*Rotor blades (Rotary wings), Fatigue (Mechanics)), Flight testing, Loading (Mechanics), Helicopter rotors, Panels (Structural), Damage.

To supplement previous data obtained with three blades, rotors with two and four blades were whirl tested using the excitation panel technique. Rotor blades were tested having two different chord widths. A survey was made of the transient pressures produced on the excitation panels by the rotor blades. The resonant frequency of the third bending mode of the rotor blade was shifted from below the normal operating range to the maximum continuous power-on rpm by adding external weights to the blade leading edge. The use of a counterweight to replace a fatigue-damaged rotor blade during whirl testing was studied and rejected as being overly complicated. (Author)

AD-641 246 **Field 1C, 1A**
CFSTI Prices: HC$3.00 MF$0.75
David Taylor Model Basin, Washington, D. C. Aerodynamics Lab.
WIND TUNNEL INVESTIGATION OF AN ASPECT RATIO 10 TANDEM WING AIRCRAFT CONFIGURATION IN GROUND EFFECT. PART I. LONGITUDINAL CHARACTERISTICS,
by Charles W. Harry, and Lynn A. Trobaugh. Jul 66, 71p Aero-1111-1
DTMB-2259-1

Descriptors: (*Wing-body configurations, Aspect ratio), (*Pitch (Motion), Aircraft), Wings, Wind tunnels, Lift, Drag, Center of gravity, Ground effect.

Subsonic wind-tunnel test results of a tandem wing aircraft configuration are given. Conventional longitudinal tests out of ground effect, and similar tests in ground effect, employing the ground board test technique, were conducted on the configuration. Test variables included height above the surface, forward and aft wing incidence angles, angle of attack, and center-of-gravity location. (Author)

N66-31206 **Field 1C**
CFSTI Prices HC$4.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A POWERED MODEL OF A TWIN-PROPELLER DEFLECTED-SLIPSTREAM STOL AIRPLANE CONFIGURATION.
by G. L. Gentry, A. D. Hammond, and R. J. Margason. Jul 66, 139p NASA-TN-D-3438

Descriptors: *Longitudinal stability and control, *Propeller slipstream, *Stol aircraft, Aircraft, Angle of attack, Body, Characteristics, Configuration, Control, Deflection, Flap, Landing, Longitudinal, Model, Powered, Propeller, Slipstream, Stability, Stand, Takeoff, Tunnel, Twin, Wind, Wing.

For abstract, see STAR 04 17.

N66-31728 **Field 1C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
COMPARISON OF CONTROL-FIXED STABILITY DERIVATIVES FOR TWO SUPERSONIC FIGHTER AIRPLANES AS DETERMINED FROM FLIGHT AND WIND-TUNNEL TESTS.
by H. L. Crane, M. D. Mc laughlin, and J. A. White. Apr 59, 37p NASA-MEMO-2-3-59L

Descriptors: *Control stability, *Flight test, *Supersonic aircraft, *Wind tunnel, Aircraft, Comparison, Control, Derivative, Engine, Flight, Flow, Mass, Stability, Supersonic, Test, Tunnel, Wind.

For abstract, see STAR 04 17.

N66-32546 **Field 1C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AERODYNAMICS OF AIRFRAME-ENGINE INTEGRATION OF SUPERSONIC AIRCRAFT.
by M. R. Nichols. Aug 66, 45p NASA-TN-D-3390

Descriptors: *Aerodynamics, *Airframe, *Propulsion system, *Supersonic aircraft, Aircraft, Boundary, Coefficient, Distortion, Drag, Field, Flow, Integration, Interference, Layer, Load, Nozzle, Pressure, Propulsion, Shock, Structure, Supersonic, System, Wave.

For abstract, see STAR 04 17.

N66-32555 **Field 1C**
CFSTI Prices HC$3.00 MF$1.00
Alpha Research, Inc., Santa Barbara, Calif.
AEROBEE 150 A ROLL LOCK-IN STUDY FINAL SUMMARY REPORT, APR. - NOV. 1965.
by J. E. Brunk. Nov 65, 121p NASA-CR-76800
Contract NAS5-9566
Its Rept.-65-9566-7

Descriptors: *Aerobee rocket, *Aerodynamics, *Motion stability, *Resonance effect, Analysis, Angle of attack, Asymmetry, Coupling, Effect, Fin, Four, Moment, Motion, Near, Pitch, Quasi-steady, Resonance, Rocket, Roll, Side, Simulation, Sounding, Stability, Vector, Yaw.

For abstract, see STAR 04 17.

N66-32642 **Field 1C**
CFSTI Prices HC$3.25 MF$1.00
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile And Space Systems Div.
DOUGLAS TASKS FOR AIRBORNE SOLAR ECLIPSE EXPEDITION OF MAY 30, 1965.
by R. M. Cameron. Aug 65, 173p NASA-CR-76980, SM-48792
Contract NAS2-2703

Descriptors: *Airborne equipment, *Nasa program, *Solar eclipse, Airborne, Cv-990 aircraft, Eclipse, Equipment, Expedition, Flight, Installation, Instrument, Mounting, Navigation, Path, Procurement, Science, Solar, Specification, Test, View, Window.

For abstract, see STAR 04 17.

N66-37032 **Field 1C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
STATIC AND DYNAMIC LONGITUDINAL STABILITY DERIVATIVES OF A POWERED 1/9-SCALE MODEL OF A TILT-WING V/STOL TRANSPORT.
by J. R. Chambers, and S. B. Grafton. Sep 66, 54p NASA-TN-D-3591

Descriptors: *Dynamic stability, *Longitudinal stability, *Static stability, *Tilt-wing aircraft, *Transport aircraft, *V/stol aircraft, Aircraft, Derivative, Dynamic, Force, Longitudinal, Model, Oscillation, Powered, Scale, Stability, Static, Test, Tilt, Transport, V/stol, Wing.

For abstract, see STAR 04 22.

N66-37295 **Field 1C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Flight Research Center, Edwards, Calif.
LIMITED FLIGHT EVALUATION OF TACTAIR FLUID CONTROL STABILITY AUGMENTATION SAFETY SYSTEM.
by C. K. Jones. Jun 66, 25p NASA-TM-SX-1284

Descriptors: *Aircraft control, *Safety device, *Stability augmentation, Activation, Aircraft, Augmentation, Automatic, Autopilot, Control, Device, Flight, Light, Safety, Stability, Test.

For abstract, see STAR 04 22.

N66-37299 **Field 1C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
THE PROBLEM OF ROUGHNESS DRAG AT SUPERSONIC SPEEDS.
by K. R. Czarnecki. Oct 66, 16p NASA-TN-D-3589, NASA-SP-124
Contract 126-13-03-22-23
Presented At Conf. On Aircraft Aerodyn., Langley Station, Va., 23-25 May 1966 Also Published In Nasa-sp-124, See X66-20041 17-01

Descriptors: *Aerodynamic characteristics, *Drag, *Supersonic speed, *Surface roughness, Aerodynamic, Aircraft, Boundary, Characteristics, Flat, Layer, Performance, Plate, Speed, Supersonic, Surface, Theory.

For abstract, see STAR 04 22.

AD-640 763 **See Field 5I**

AD-640 945 **See Field 1A**

AD-640 986 **See Field 13M**

1D. AIRCRAFT FLIGHT CONTROL AND INSTRUMENTATION

AD-640 597 **Field 1D**
CFSTI Prices: HC$5.00 MF$1.00
Bell Helicopter Co., Fort Worth, Tex.
FLIGHT EVALUATION OF THE CONTACT ANALOG PICTORIAL DISPLAY SYSTEM.
Technical rept.,
by J. G. Curtin, J. H. Emery, and C. B. Elam. Feb 66, 162p
Contracts Nonr-4429 (00), Nonr-1670 (00)
JANAIR-TR-D228-420-009

Descriptors: (*Flight control systems, Display systems), (*Display systems, Flight testing), Analog systems, Pictures, Helicopters, Ground position indicators, Hovering.

Identifiers: Evaluation.

The work represents a series of flight test evaluations of a vertical flight display or contact analog. Three experimental flight tests were conducted in the JANAIR flight test vehicle which was a UH-1 helicopter known as Research Helicopter Number 2 (RH-2). The first study evaluated the vertical display containing the basic grid plane plus a ground position indicator. The hover flight mode was the test maneuver. Four types of control stabilization were tested with the display with varying degrees of control sensitivity. The second study examined the basic grid plane with and without a director symbol in the form of a flight pathway. Speed indices were presented on the pathway in the form of tarstrips and speed markers. During cross-country flight maneuvering, a ground position indicator defined final touch-down position. Only one flight stabilization mode was tested. The flights were comprehensive in their coverage of the spectrum of basic flight maneuvers. The final investigation was designed to determine the usefulness of augmenting the display components (horizon line and basic grid plane) with a TV presentation superimposed upon the vertical flight display. Several flight modes were investigated. (Author)

AD-640 598 **Field 1D**
CFSTI Prices: HC$3.00 MF$0.75
Bell Helicopter Co., Fort Worth, Tex.
A HELICOPTER FLIGHT EVALUATION OF A HEAD-UP DISPLAY.
Technical rept.,
by J. G. Curtin, and J. H. Emery. Feb 66, 66p
Contract Nonr-4429 (00)
JANAIR-TR-D228-420-010

Descriptors: (*Instrument landings, Display systems), (*Display systems, Flight testing), Helicopters, Flight paths, Flight control systems.

Identifiers: Evaluation.

The purpose of the study was to determine the feasibility of using the Computing Devices of Canada, Ltd. Spectocom Head-Up Display in a helicopter for instrument landing approaches. The first phase examined IFR landing approach performance with the display in the fixed-wing design configuration. No other flight displays were presented. The second phase examined the same maneuver with the display augmented with heading information. Test conditions included: full VFR, simulated intermittent IFR and simulated full IFR. The test vehicle was an Army OH-13K Bell helicopter. Six rated and highly experienced helicopter pilots participated as test subjects. Results indicated that, when the display was used in the configuration designed for fixed wing, lateral flight path control was poor and IFR landing approaches were unacceptable. When heading information was added satisfactory approaches were made to a 'break-out' altitude of 100 feet. (Author)

AD-640 717 **Field 1D, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Bunker-Ramo Corp., Canoga Park, Calif. Human Engineering Group.
PILOT OPINION SURVEY OF A MOVING TAPE VERNIER PITCH DISPLAY CONCEPT.
Memorandum rept.,
by Barbara Kelso. 26 Aug 66, 18p MR-66-15
Contract AF 33 (615)-5225

Descriptors: (*Attitude indicators, Human engineering), Pilots, Public opinion, Display systems, Design, Pitch (Motion), Tapes.

The report discusses the evaluation of a moving tape vernier pitch display concept. Objective of the evaluation was to elicit opinions from pilots and engineers on: (1) the potential merit of the display concept for continued development, and (2) suggestions for improving the display format. PIS (Photographic Instrument Synthesizer) films of the pitch indicator were shown, and comments were elicited through an open-ended questionnaire. The report describes the display concept, the method employed in the evaluation, results of the questionnaire, and suggested follow-on work. (Author)

AD-640 807 **Field 1D**
CFSTI Prices: HC$3.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
A COMPUTER STUDY OF AUTOMATIC CONTROL ON THE I.L.S. GLIDE PATH.
Technical rept.,
by G. Musker, and Marian Henman. Feb 66, 51p TR-66057

Descriptors: (*Automatic pilots, Performance (Engineering)), (*Glide path systems, Instrument landings), (*Instrument landings, Automatic pilots), Damping, Control, Velocity, Acceleration, Pitch (Motion), Great Britain.

A computer study is described of the effect on I.L.S. glide path performance of the addition of various damping terms to the glide path control law of a typical autopilot. The control laws used are analysed by a number of techniques and the results achieved by the different techniques are compared. It is shown that the performance can be improved by the addition of either a vertical velocity term coupled with an acceleration term, or a vertical velocity term coupled with a pitch rate term in the control law. (Author)

AD-641 023 **Field 1D**
CFSTI Prices: HC$5.00 MF$1.00
Lear Siegler, Inc., Santa Monica. Calif. Astronics Div.
DEFINITION OF ALL WEATHER LANDING SYSTEM REQUIREMENTS FOR CATEGORY III OPERATION IN CONVAIR 880 N 112.
Interim rept.
15 Apr 66, 187p
Contract FA-66-WA-1430
Proj. FAA-320-210-01N
SRDS-RD-66-26

Descriptors: (*Jet transport planes, Landings), (*All-weather aviation, *Aircraft landings), Automatic pilots.

Identifiers: Convair 880.

Studies were made to define an All-Weather Landing System (AWLS) to be used to establish requirements for operation in Category III weather minimums. Initially a limited (Category II) system will be installed with automatic VFR touchdown capability which can later be expanded into a Category III system with minimum modification to the equipment and aircraft. To install the Category III system with minimum modifications, the auto-

pilot currently installed in the aircraft will be removed and an AWLS installed providing not only the automatic landing capability but also the normal autopilot cruise modes. The recommended system is a dual system with dual actuators and control wheels with associated force sensors. The system allows single channel operation or dual channel operation with comparators to provide warning to the pilot or disconnect of the system in the event of a failure. The force wheel installed in both the pilot and copilot positions permits evaluation of split crew duties as well as split axis control. A control augmentation mode is provided for use during manual approaches with flight director steering information. (Author)

N66-31727 **Field 1D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
LOW-SPEED MEASUREMENTS OF OSCILLATORY LATERAL STABILITY DERIVATIVES OF A MODEL OF 60 DEG DELTA-WING BOMBER.
by J. W. Paulson. Aug 59, 36p NASA-TM-X-13

Descriptors: *Bomber aircraft, *Delta wing, *Lateral stability, *Low speed wind tunnel. Aircraft, Angle of attack, Bomber, Delta, Lateral, Low speed, Model, Moment, Oscillation, Pod, Sideslip, Stability, Tunnel, Wind, Wing.

For abstract, see STAR 04 17.

N66-31729 **Field 1D**
CFSTI Prices HC$2.50 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
THE TRANSONIC AERODYNAMIC CHARACTERISTICS OF TWO VARIABLE-SWEEP AIRPLANE CONFIGURATIONS CAPABLE OF LOW-LEVEL SUPERSONIC ATTACK.
by W. J. Alford Jr, R. P. Bielet, and A. W. Robins. Aug 66, 55p NASA-TM-X-304

Descriptors: *Aerodynamic characteristics, *Transonic speed, *Variable sweep, Aerodynamic, Attack, Characteristics, Drag, Lift, Low level, Speed, Supersonic, Sweep, Test, Transonic, Tunnel, Variable, Wind.

For abstract, see STAR 04 17.

N66-31730 **Field 1D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
TRANSONIC AND SUPERSONIC FLUTTER TREND INVESTIGATION OF A VARIABLE-SWEEP WING.
by R. C. Goetz, and J. C. Stonesifer. Oct 61, 29p NASA-TM-X-598

Descriptors: *Flutter analysis, *Supersonic speed, *Transonic speed, *Variable sweep, Analysis, Density, Flutter, Mass, Pivot, Planform, Speed, Supersonic, Sweep, Transonic, Tunnel, Variable, Wind.

For abstract, see STAR 04 17.

N66-31731 **Field 1D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
STABILITY AND CONTROL CHARACTERISTICS AT A MACH NUMBER OF 1.97 OF AN AIRPLANE CONFIGURATION HAVING TWO TYPES OF VARIABLE- SWEEP WINGS.
by G. V. Foster, and O. A. Morris. Aug 60, 48p NASA-TM-X-323

Descriptors: *Aerodynamic stability, *Supersonic wind tunnel, *Variable sweep, Aerodynamic, Angle, Chord, Control, Geometry, Lift, Mach number, Pitch, Pivot, Stability, Supersonic, Sweep, Tunnel, Variable, Wind, Wing.

For abstract, see STAR 04 17.

N66-32641 **Field 1D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
THE CASE FOR INHERENT STABILITY OF HELICOPTERS.
by J. F. Garren Jr, J. P. Reeder, and R. J. Tapscott. 1966, 29p NASA-TM-X-57798
Presented At Agard Meeting On Helicopter Develop., Paris, 10-14 Jan. 1966

Descriptors: *Control stability, *Helicopter control, *Stability augmentation, Augmentation, Characteristics, Control, Failure, Flight, Helicopter, High performance, Landing, Safety, Stability, System.

For abstract, see STAR 04 17.

N66-36850 **Field 1D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A FLIGHT STUDY WITH A LARGE HELICOPTER SHOWING TRENDS OF LATERAL AND LONGITUDINAL CONTROL RESPONSE WITH SIZE.
by R. W. Sommer, and R. J. Tapscott. Sep 66, 12p NASA-TN-D-3600
Contract 721-04-00-02-23

Descriptors: *Flight test, *Helicopter, *Lateral control, *Longitudinal control, Angular, Control, Damping, Flight, Lateral, Longitudinal, Pitch, Response, Roll, Rotor, Single, Size, Test, Vehicle, Velocity, Vtol.

For abstract, see STAR 04 22.

N66-36856 **Field 1D**
CFSTI Prices HC$3.75 MF$1.75
Goodyear Aerospace Corp., Akron, Ohio.
STATE-OF-THE-ART STUDY FOR HIGH-SPEED DECELERATION AND STABILIZATION DEVICES FINAL REPORT.
by W. C. Alexander, and R. A. Lau. 10 Sep 66, 299p NASA-CR-66141, GER-12616
Contract NASW-1288

Descriptors: *Deceleration, *Hypersonic speed, *Stabilization, *Supersonic speed, Aerodynamic, Decelerator, Deployment, Drag, High speed, Hypersonic, Mach number, Parachute, Porosity, Recovery, Reentry, Speed, Stability, Supersonic, Wake.

For abstract, see STAR 04 22.

1E. AIR FACILITIES

AD-640 602 **Field 1E**
CFSTI Prices: HC$4.00 MF$0.50
National Aviation Facilities Experimental Center, Atlantic City, N. J.
A CONFIGURATION DESIGN CONCEPT FOR DISTANCE CODED MARKING OF CATEGORY II AND IIIA RUNWAYS.
Final rept.,
by Robert K. McKelvey, and Guy S. Brown. May 66, 119p
Proj. 430-008-01R
SRDS-RD-66-37

Descriptors: (*Runways, *Markers), Configuration, Design, Visual signals, Landing aids, Take-off, Fog.

Eight experiments were conducted in a program with the objective of providing a configurational design concept for a system of distance coded runway marking geared particularly to the support of landing and take-off operations in Category II and III-A bright daylight contact fogs (fog extending to the surface - no ceiling). Among other criteria the system must meet are distance coding of a bidirectional runway, compatibility with runway lighting, and resistance to loss of configurational integrity through operational wear. A symbolic distance indicating system was regarded as having demonstrated the greatest potential for meeting the full array of design objectives and is recommended for service test and evaluation. (Author)

AD-640 603 **Field 1E, 4A**
CFSTI Prices: HC$3.00 MF$0.50
Weather Bureau, Atlantic City, N. J. Test and Evaluation Lab.
EVALUATION OF SEVERAL MULTI-TRANSMISSOMETER SYSTEMS.
Interim rept.,
by Matthew Lefkowitz, and Ernest E. Schlatter.
Jul 66, 55p
Proj. 450-402-05E
SRDS-RD-66-45

Descriptors: (*Optical instruments, Visibility), (*Meteorological instruments, Visibility), (*Runways, Visibility), Pilots, Atmosphere, Visual perception, Illumination.

Identifiers: Transmissometers, Evaluation.

A test program was developed and implemented to evaluate multi-transmissometer systems. These consist primarily of instruments at touchdown, midpoint, and roll-out locations at five airfields distributed across the continent in differing climatic regimes. The airfields are located at Atlantic City, N. J., New York City, N. Y., Chicago, Ill., Denver, Colo., and Los Angeles, Calif. The data acquisition technique and program are described. Preliminary analysis of the small data sample thus far indicates that while large differences may exist between instrument locations, they tend to diminish as visibility decreases. (Author)

AD-641 286 **See Field 17G**

3A. ASTRONOMY

AD-640 756 **Field 3A**
CFSTI Prices: HC$2.00 MF$0.50
Lowell Observatory, Flagstaff, Ariz.
MULTICOLOR PHOTOELECTRIC PHOTOMETRY OF THE NUCLEI OF GALAXIES.
Final rept.,
by William G. Tifft. 1 Aug 66, 33p A66-4a
Grant Nonr (G)-00026-64

Descriptors: (*Galaxies, Colorimetry), Photometers, Optical properties, Colors, Luminosity, Astronomical data, Tables.

Sixty-four galaxies, including forty-four in the region of the Virgo Cluster have been observed photoelectrically in four colors. Five apertures from 10 to 65 arc seconds were used for most of the systems. Four basic types of galaxies are recognized among both spirals and ellipticals: (1) normal systems which become smoothly redder toward the center; (2) relatively blue galaxies with otherwise normal color curves; (3) galaxies with abnormally red nuclei, and (4) galaxies with strong blue nuclei. (Author)

AD-641 039 **Field 3A**
Not available from CFSTI.
California Univ., Los Angeles. Dept. of Astronomy.
SPECTROPHOTOMETRIC STUDIES OF GASEOUS NEBULAE. IV. THE ORION NEBULA,
by James B. Kaler, Lawrence H. Aller, and Ira S. Bowen. 6 Nov 64, 14p
Grant AF-AFOSR-83-65
Proj. AF-9774
Task 977401
AFOSR-66-1591
See also AD-628 456.
Availability: Published in Astrophysical Journal v141 p912-22 1 Apr 1966.

Descriptors: (*Nebulae, Spectroscopy), Line spectrum, Emissivity, Intensity, Electron transitions.

Identifiers: Orion nebula.

Wavelengths, identifications, and intensities for emission lines of the Orion Nebula are given for the wavelength region 3187- 5016A. The intensities were corrected to outside the atmosphere by published photoelectric intensities and observation of a standard star. Lines as faint as 0.015 on the scale H-beta=100 are recorded. (Author)

N66-30338 **Field 3A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A DUAL TELESCOPE FOR SPECTROHELIOGRAPHY IN THE EXTREME ULTRA-VIOLET.
by J. Milligan, J. Underwood, and W. A. White. 28 Mar 66, 22p NASA-TM-X-55515, X-614-66-132

Descriptors: *Reflecting telescope, *Spectroheliograph, *Ultraviolet spectrograph,Activity, Camera, Component, Design, Dual, Film, Filter, Image, Mirror, Reflection, Sensor, Solar, Spectrograph, Telescope, Ultraviolet.

For abstract, see STAR 04 17.

N66-31486 **Field 3A**
CFSTI Prices HC$7.00 MF$1.75
Virginia Polytechnic Inst., Blacksburg.
PROCEEDINGS OF THE CONFERENCE ON THE EXPLORATION OF MARS AND VENUS.
Aug 65, 320p NASA-CR-76363
Contract NGR-47-004-008
Conf. Held At Va. Polytech. Inst., Blacksburg, 23-27 Aug. 1965 Its Eng. Extension Ser. Circ. No. 5

Descriptors: *Conference, *Mars (planet), *Planetary exploration, *Venus, Atmosphere, Balloon, Biological, Chemistry, Circulation, Core, Exploration, Field, Gravitational, Interior, Laboratory, Landing, Life, Manned, Mariner space probe, Meteorology, Orbit, Origin, Planetary, Reconnaissance, Surface, Telescope, Voyager project.

For abstract, see STAR 04 17.

N66-31926 **Field 3A**
CFSTI Prices HC$2.50 MF$0.50
Minnesota Univ., Minneapolis. School Of Physics.
A STUDY OF THE FEASIBILITY OF EMPLOYING A MAGNETIC MASS SPECTROMETER FOR THE ANALYSIS OF THE MARTIAN ATMOSPHERE.
by A. O. Nier. 20 Dec 62, 58p NASA-CR-76498
Contracts NAS7-100, JPL-950241
Prepared For Jpl

Descriptors: *Mars atmosphere, *Mass spectrometer, *Planetary atmosphere, Atmosphere, Ion, Magnetic, Mars, Mass, Planetary, Pump, Sector, Spectrometer, Sputtering, Transistor, Weight.

For abstract, see STAR 04 17.

N66-31937 **Field 3A**
CFSTI Prices HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Atmospheric Sciences Branch.
AIRBORNE OBSERVATIONS OF THE COMET IKEYA- SEKI (1965F).
by E. V. Petersen. May 66, 45p NASA-CR-76526, SM-52056
Contract NASW-1352

Descriptors: *Aerial photography, *Astronomical photography, *Comet, Aerial, Astronomical, Emission, Exposure, Image, Instrumentation, Moon, Mounting, Nucleus, Perihelion, Photography, Sodium, Stabilization, Tail, Telescope, Venus.

For abstract, see STAR 04 17.

N66-32255 **Field 3A**
CFSTI Prices HC$3.25 MF$1.00
Arizona Univ., Tucson.
COMMUNICATIONS OF THE LUNAR AND PLANETARY LABORATORY, VOLUME 4, PART 3 - UBVRIJKL PHOTOMETRY OF THE BRIGHT STARS.
by B. Iriarte, H. L. Johnson, R. I. Mitchell, and W. Z. Wisniewski. 1966, 157p NASA-CR-76683
Grant NSG-161
Its Commun.-63

Descriptors: *Photometry, *Stellar luminosity, *Table, Band, Brightness, Data, Error, Filter, Infrared, Luminosity, Multicolor, Probability, Quality, Stellar, Ultraviolet, Wavelength.

For abstract, see STAR 04 17.

N66-32266 **Field 3A**
CFSTI Prices HC$7.00 MF$1.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GODDARD SPACE FLIGHT CENTER CONTRIBUTIONS TO THE COSPAR MEETING - MAY 1965.
Jul 66, 296p NASA-TN-D-3091
Presented At The 5th Intern. Space Sci. Symp., Buenos Aires, May 1965

Descriptors: *Conference, *Geomagnetically trapped particle, *Geophysics, *Ionospheric current, *Mesosphere, *Satellite design, *Southern hemisphere, Anomaly, Capability, Current, Density, Design, Electron, Flare, Flux, Geomagnetic, Hemisphere, Ionospheric, Neutron, Particle, Satellite, Solar, South, Star, Structure, Temperature, Thermosphere, Trap.

For abstract, see STAR 04 17.

3B. ASTROPHYSICS

AD-409 869 **Field 3B**
CFSTI Price: HC$18.40
Naval Ordnance Test Station, China Lake, Calif.
SPECTROSCOPIC STUDIES USING FOURIER TRANSFORMATIONS,
by Janine Connes. Jan 63, 178p NOTS-TP-3157
Task RTSA-30013/216-7/F019-01-002
NAVWEPS-8099, TT-65-60304
Recherches sur la Spectroscopie par Transformation de Fourier, trans. from Revue d'Optique Theorique et Instrumentale (France), v40 p45-8, p116-40, p171-90, p231-65 1961.

Descriptors: (*Infrared spectroscopy, Feasibility studies), (*Interferometers, Fourier analysis), (*Digital computers, Analog systems), Errors, Signal-to-noise ratio, Night sky, Germanium, Functions, Theory, Sampling, Particle beams, Measurement, Phase measurement, Analysis of variance, Transformations, Band pass filters, Frequency modulation, Electric filters, Filters.

The use of the Michelson interferometer for spectroscopy in the infrared is considered and the following are discussed: Fourier analysis of the interferogram using high-speed digital computers and analog methods, instrumental errors, analysis of noise and procedures for attaining maximum s/n ratios, specific applications to night sky spectrometry in the 1 micron to 1.6 micron region as well as to the re-emission spectrum of germanium, and comparison of this method with those using classical spectroscopic instruments. (Author)

AD-453 029 **Field 3B**
CFSTI Price: HC$5.60
Stanford Univ., Calif. Stanford Electronics Labs.
RADAR ASTRONOMY AND PROPAGATION RESEARCH.
Final rept., 1 Dec 60-31 Aug 64,
by H. T. Howard, B. B. Lusignan, and V. R. Eshleman. Sep 64, 51p SU-SEL-64-114
Contract AF 19 (604)-7436
Proj. AF-5629
Task 562901
AFCRL-65-71, N65-23256

Descriptors: (*Radio astronomy, Propagation), Solar corona, Ionospheric propagation, Electron density, Yagi antennas, Moon, Magneto-optic effect, Signal-to-noise ratio, Doppler effect, Radar echo areas, Magnetic fields, Plasma physics, Meteors.

Research in this report and application of radar astronomy techniques for study of the solar corona, interplanetary gas density, ionospheric electron content, and cislunar gas density. It included; (1) completion of the 300-kw transmitter and log-periodic antenna array for solar and lunar radar work; (2) attempts to reestablish radar contact with the solar corona, including development of pseudo-random coding and cross correlation techniques for optimizing ranging information and detection; (3) intensive study of the polarization, strength, and doppler excess of moon reflected signals to obtain ionospheric electron content, scintillation information, and rate of change of electron content over the earth-moon path as a function of time; (4) daily measurements of the total ionospheric electron content using Faraday rotation differences between two closely space frequencies reflected from the moon; (5) development of computer methods for sampling and digitizing analog moon data recorded on magnetic tape; and (6) theoretical studies of the scattering from, and transmission through, plasmas as applied to the density and constitution of interplanetary gas and planetary ionospheres. Much of the experimental program was made possible by the availability of unique and extensive radar facilities acquired and constructed under this contract. (Author)

AD-640 586 **Field 3B, 14B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
A GYRO-STABILIZED AIRBORNE ECLIPSE SPECTROGRAPH.
Instrumentation papers,
by Richard B. Dunn. 15 Dec 65, 9p AFCRL-IP-112, AFCRL-66-597
Proj. AF-7649
Task 764906
Revision of manuscript submitted 27 Nov 65.
Availability: Published in ISA Transactions v5 n2 p119-23 Apr 1966.

Descriptors: (*Spectrum analyzers, *Solar corona), Airborne, Gyro stabilizers, Servomechanisms.

Two identical 10-in. telescope and f/4 spectrograph combinations were constructed for observing the solar corona at the May 30, 1965 eclipse from the ground and from a jet aircraft. The spectrographs covered the range 3000-9000 A with an average dispersion of 36 A/mm and resolution of 1 A. Gyro-controlled servo systems improved the pointing accuracy of the instrument about two axes by a factor of 25 in comparison with the aircraft guidance system alone. Guidance errors never exceeded 40 sec peak-to-peak during the eclipse. The guidance on many of the exposures was within 10 sec. (Author)

AD-640 661 **Field 3B**
CFSTI Prices: HC$6.00 MF$1.25
Colorado Univ., Boulder.
TRANSIENT FLARE-ASSOCIATED PHENOMENA IN THE SOLAR ATMOSPHERE.

Technical rept., 1964-66,
by Gerald F. Anderson. Sep 66, 241p
Contract Nonr-1147 (13), Grant Nonr (G)-00059-64
Projs. RR002-10-01-1-24, RR-004-06-01
Task 046-740
Supported in part by grants Nonr (G)-00046-65 and Nonr (G)-00025-66.

Descriptors: (*Solar atmosphere, *Solar flares), (*Magnetohydrodynamics, Solar atmosphere), Atmosphere models, Propagation.

Disturbances propagating from flares, as observed by high time resolutions H alpha Lockheed filtergrams, are analyzed. A theoretical model is developed, assuming a magnetohydromagnetic pulse which is generated by a source located in the flare region, propagates from the source and is refracted in the solar corona. Ray tracing calculations, when fitted to the observations, yield reasonable source heights and magnetic fields. (Author)

AD-640 725 **Field 3B, 22A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON TWILIGHT INVESTIGATIONS OF PLANETARY ATMOSPHERES FROM SPACE SHIPS,
by G. V. Rozenberg. 17 Jun 66, 20p FTD-MT-65-400
TT-66-62496
Edited machine trans. of Akademiya Nauk SSSR. Izvestiya. Fizika Atmosfery i Okeana, v1 n4 p377-85 1965.

Descriptors: (*Planetary atmospheres, Twilight), (*Space probes, Planetary atmospheres), Light transmission, Scattering, Equations, USSR.

AD-640 803 **Field 3B**
CFSTI Prices: HC$3.00 MF$0.75
Arizona Univ., Tucson. Lunar and Planetary Lab.
LUNAR INVESTIGATIONS.
Final rept., 1 Mar 61-31 Oct 64,
by Gerard P. Kuiper, David W. G. Arthur, and Ewen A. Whitaker. Apr 65, 78p
Contract AF 19 (604)-8064
Projs. AF-8654, AF-7600
Tasks 865401, 760006
AFCRL-66-194

Descriptors: (*Moon, *Mapping), Photogrammetry, Extraterrestrial topography, Astrophysics, Rotation, Mars (Planet), Jupiter (Planet).

Identifiers: Selenodetics.

The limitations of classical selenodesy, that is, the Bessel-Wichmann method for the moon's constants of rotation, are discussed and methods for overcoming these are described. These methods depend on the use of scaled and oriented lunar photographs. The orientation problem is solved by the acquisition of star-trailed lunar photographs and the observation-reduction technique for these is described. This takes account of the curvature of the trail and the different refractions in the lunar and stellar exposures. The report gives full details of a photogrammetric method (independent of the rotation theory), and a more conventional method, for selenodetic coordinates. Both of these avoid correlation difficulties and the latter is the most direct of all published methods. The techniques for measurement and reduction to obtain relative lunar altitudes have been tested and details are given. The method overcomes the problem of the varying directions of the projected lunar shadows. The calibration theory and methods for the Mann 422-C comparator, used at LPL for selenodetic work, are given. On the publication side the report details the preparation of the Rectified Lunar Atlas, Part II of the Orthographic Atlas of the Moon, and the Consolidated Catalog of Selenographic positions; the latter is still the basis of all precise contemporary lunar cartography. Details of the Yerkes program of selenodetic photography are given. (Author)

AD-641 055 **Field 3B**
Not available from CFSTI.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
LIGHT FLUCTUATIONS DUE TO AN INTERGALACTIC FLUX OF GRAVITATIONAL WAVES,
by David M. Zipoy. 13 Oct 65, 15p
Grant AF-AFOSR-409-65
Proj. AF-9751
975103
AFOSR-66-0800
Availability: Published in Physical Review v142 n4 p825-38 Feb 25 1966.

Descriptors: (*Stars, Light), (*Gravity, Optical properties), Field theory, Relativity theory, Intensity.

Identifiers: Gravitational radiation.

A formula is derived that gives the time dependence of the intensity of a light beam that has passed through an arbitrarily varying gravitational field. The formula is valid to second order in the gravitational field strength and is valid only in the geometrical-optical limit for the light beam. An application of the formula to the case where there is only a single source of gravitational field, such as a binary star system, shows that the effect is exceedingly small. Then the case where space is filled uniformly with gravitational radiation is considered. It is found that for a small light source at a distance of a few billion light years the largest effect that can be expected amounts to an intensity variation of a thousandth of a percent. At larger distances it is conceivable that there would be observable intensity fluctuations; however, the formulas derived in the paper are not valid at such great distances. (Author)

AD-641 106 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEW TECHNIQUES IN ASTRONOMY MATERIALS OF THE 1961 CONFERENCE: SELECTED ARTICLES.
6 Apr 66, 22p FTD-TT-65-1537
TT-66-62517
Unedited rough draft trans. of mono. Novaya Tekhnika v Astronomii. Materialy Soveschchaniya 1961 G, n.p. 1963 p165-70, 171-4.

Descriptors: (*Spectrum analyzers, *Astronomy), (*Mirrors, Test methods), USSR, Vacuum apparatus, Instrumentation, Spectra (Infrared).

Contents: Spectrograph with photocontact device to observe fogginess, Experience in using a vacuum chamber for testing accurate mirrors of astronomical instruments.

AD-641 127 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
LUNAR RESEARCH ON THE MOON,
by Zdenek Kopal, and Wayne A. Roberts. Aug 66, 34p D1-82-0562, Mathematical note-479

Descriptors: (*Moon, *Astrophysics), Lunar bases, Lunar environment, Geology.

An outline of our present knowledge of the composition and internal structure of the Moon and of its surface environmen t is given in so far as it may affect our ability to establish a lunar base, and to define objectives for investigations to be carried out there. An outline of the methods to be used in such work is also presented. It is stressed that the main objectives of the first lunar laboratory should be an investigation of the vertical structure of the surface to a depth of 100 - 1000 meters by direct methods (drilling), and down to its center by indirect methods, in order to provide a three-dimensional extension to two-dimensional prospecting of the surface from orbiting spacecraft.

AD-641 291 **Field 3B**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Astronomy.
ATMOSPHAREN VON ZENTRALSTERNEN PLANETARISCHER NEBEL I (Atmospheric Models of the Central Stars of Planetary Nebulae I),
by K. H. Bohm, and W. Deinzer. 4 Jan 65, 20p
Grant AF-AFOSR-171-63
Proj. AF-9774
Task 977401
AFOSR-66-0371
Text in German; attached summary in English. Prepared in cooperation with Heidelberg Univ., (West Germany).
Availability: Published in Zeitschrift fur Astrophysik v61 p1-19 1965.

Descriptors: (*Nebulae, Mathematical models), Atmosphere, Gravity, Thermal radiation, Temperature, Equations, Iterative methods, West Germany.

The calculation of atmospheric models for the central stars of planetary nebulae is discussed. The determination of the effective temperature T and the surface gravity g for these stars is based on O'Dell's (1963) recent data. A Fortran program was developed for the purpose of solving simultaneously the equations of hydrostatic and of nongrey radiative equilibrium. The program includes the calculation of the monochromatic absorption coefficients due to H, HeI, HeII, CIII, CIV, NIII, NIV, NV, OIII, OIV, OV, NeII, NeIII, NeIV, NeV.--Radiation pressure was taken into account. The equations of nongrey radiative equilibrium are solved by LUCY's (1964) iteration method; this is especially convenient if electron scattering becomes important. (Author)

AD-641 295 **Field 3B**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Astronomy.
PRESSURE BROADENING AND OPACITY IN THE M2V STAR HD 95735,
by M. S. Vardya, and Karl-Heinz Bohm. 12 Oct 64, 8p
Grant AF-AFOSR-171-63
Proj. AF-9774
Task 977401
AFOSR-66-1592
Availability: Published in Monthly Notices of the Royal Astronomical Society v131 n1 p89-94 1965.

Descriptors: (*Stars, Astrophysics), Models (Simulations), Temperature, Pressure, Wave transmission.

Identifiers: Opacity.

The possibility that unknown sources of opacity may exist in the M2V spectral class star, HD 95735, has been investigated. The factor by which the known sources of opacity should be multiplied to obtain the opacity obtaining in the star is estimated by comparing the total pressure obtained from model atmosphere and that from pressure broadened wings of lambda 4227 line of CaI. This factor is close to unity if the effective temperature of the star is about 3400K, and it increases for lower effective temperatures. The effect of metal abundance has also been considered. (Author)

AD-641 297 **Field 3B**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Astronomy.
STUDIES IN STELLAR EVOLUTION. III. THE CALCULATION OF MODEL ENVELOPES,
by Louis Henyey, M. S. Vardya, and Peter Bodenheimer. 12 Apr 65, 16p
Grant AF-AFOSR-171-63
Proj. AF-9774
Task 977401
AFOSR-66-1271
Availability: Published in The Astrophysical Journal v142 n3 p841-54 1 Oct 1965.

Descriptors: (*Stars, Mathematical models), Boundary layer, Equations, Atmosphere, Approximation (Mathematics), Theory, Convection (Atmospheric).

The formal theory underlying existing techniques for representing the superadiabatic layers in convective envelopes is re-examined. Particular emphasis is placed on the discussion of points of uncertainty and possible controversy. The analysis has been carried out in a form which permits the formulation of certain constants, the arbitrariness of whose values represents the inherent uncertainty in the theory. Parallel calculations based on different values of these constants lead to a quantitative evaluation of their effect upon evolutionary tracks in the Hertzsprung-Russell diagram. Marked effects result from uncertainties in the ratio of mixing length to scale height and possibly from inadequate knowledge concerning opacities at low temperatures. (Author)

AD-641 298 **Field 3B**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Astronomy.
THE TIME EVOLUTION OF AN H II REGION.
Revised ed.
by William G. Mathews. 21 Apr 65, 24p
Grant AF-AFOSR-171-63
Proj. AF-9774
Task 977401
AFOSR-66-1582
Revision of manuscript submitted 28 Dec 64.
Availability: Published in The Astrophysical Journal v142 n3 p1120-40 Oct 1 1965.

Descriptors: (*Interstellar matter, Astrophysics), Thermodynamics, Hydrogen, Ionization, Luminescence, Temperature, Gas ionization, Fluid mechanics, Kinetic theory, Boundary value problems, Time.

Identifiers: H II regions.

The dimensions of Stromgren spheres when stellar black-body radiation is first saturated by recombinations are compared to the dimensions of Stromgren spheres in pressure equilibrium. The time scales for the formation of these spheres are compared with the turn-on time for the stellar ultraviolet luminosities and the lifetimes of various stars on the main sequence. The mean absorption coefficient for ionizing hydrogen and the mean photon energy are evaluated as functions of optical depth at the Lyman limit. The equations of hydrodynamics with radiative transfer and cooling by (0 II) radiation are differenced. A detailed numerical solution is made for a 30 M 0 star that moves onto the main sequence with the effective temperature and ultraviolet photon luminosity determined from accurate pre-main-sequence evolution tracks of Bodenheimer. On the main sequence T =41958K and luminosity = 8.75 X 10 to the 48th power ultraviolet photons/sec. The star is assumed to form in an infinite medium of neutral hydrogen at rest at 100K. The complete run of gas velocity, density, temperature, pressure, degree of ionization, photon flux, and optical depths are given at time t= 9,190, 30,7, and 61,600 years. It is found that a sharp maximum in the gas temperature follows the ionization front. The cooling by (0 II) radiation immediately behind the front and the gradual rise in the equilibrium temperature outward from the star keep the velocity of most of the ionized gas in the H II region <0.1 km/sec. At t= 61,600 years a strong shock is moving ahead of the ionization front into the neutral gas. Allowances for cooling in the neutral gas and magnetic fields are not made. (Author)

LA-3453 **Field 3B**
CFSTI Prices: HC$300 MF$0.75
Los Alamos Scientific Lab., N. Mex.
CONTRIBUTIONS TO THE FEASIBILITY STUDY OF AN EARLY LUNAR FLARE.
by R. A. Jeffries, and Jerry Wackerle. 14 Jan 66, 81p
Contract W-7405-eng-36

Descriptors: (*Lunar environment, Feasibility studies), (*Moon, Surface properties).

For abstract, see NSA 20 21.

N66-30082 **Field 3B**
CFSTI Prices HC$6.00 MF$1.75
National Aeronautics And Space Administration, Washington, D. C.
OBSERVATIONS OF THE MOON, MARS, URANUS, AND THE STARS. OPTICAL PROPERTIES OF PLANTS.
Nablyudeniya Luny, Marsa, Urana - Zvezd. Opticheskiye Svoystva Rasteniy
by G. A. Tikhov. Jun 66, 320p NASA-TT-F-419
Transl. Into English Of The Publ. "trudy Sektora Astrobotaniki", V. 8 Alma-ata, Izd. Akad. Nauk Kazakh. Ssr, 1960

Descriptors: *Asteroid, *Mars environment, *Plant (biol), *Uranus, *Variable star, Biology, Environment, Extraterrestrial, Life, Lunar, Magnetic, Mars, Moon, Optical, Plant, Property, Spectrum, Star, Stellar, Variable, Vesta.

For abstract, see STAR 04 17.

N66-30277 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CONCERNING A NEW THEORY OF TYPE I COMET TAILS.
by B. D. Donn, and N. F. Ness. Jun 65, 32p NASA-TM-X-55287, X-612-65-272
Presented At The 13th Intern. Astrophys. Symp., 5-7 Jul. 1965

Descriptors: *Comet, *Plasma confinement, *Solar wind, *Tail, Confinement, Density, Enhancement, Field, Formation, Hypothesis, Line, Magnetic, Neutral, Particle, Plasma, Region, Solar, Trapping, Wind.

For abstract, see STAR 04 17.

N66-30282 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Trw Systems, Redondo Beach, Calif.
IONIZATION PROBABILITY OF IRON PARTICLES AT METEORITIC VELOCITIES.
by J. F. Friichtenicht, and J. C. Slattery. 18 Feb 66, 25p NASA-CR-74110, TRW-4525-6001-R-0000
Contract NASW-1336

Descriptors: *Ablation, *Air, *Argon, *Ion production, *Iron, *Supersonic speed, Ion, Ionization, Metal, Micron, Pair, Particle, Probability, Production, Size, Speed, Supersonic.

For abstract, see STAR 04 17.

N66-30332 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LONG PERIOD LUNAR AND SOLAR EFFECTS ON THE MOTION OF RELAY 2.
by T. L. Felsentreger. Mar 66, 46p NASA-TM-X-55509, X-547-66-102

Descriptors: *Gravity, *Lunar gravitational effect, *Orbit perturbation, *Radiation pressure, *Relay ii satellite, *Solar gravitational effect, Communication, Eccentricity, Effect, Element, Inclination, Lunar, Orbit, Orbital, Perturbation, Pressure, Radiation, Satellite, Solar.

For abstract, see STAR 04 17.

N66-30344 **Field 3B**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DYNAMICAL BEHAVIOR OF EJECTA FROM THE MOON. PART I - INITIAL CONDITIONS.
by B. E. Shute. Apr 66, 83p NASA-TM-X-55521, X-643-66-158

Descriptors: *Lunar dust, *Moon-earth trajectory, *Orbital element, Dust, Earth, Element, Energy, Geocentric, Heliocentricity, Lunar, Meteorite, Momentum, Moon, Orbit, Orbital, Particle, Path, Tektite, Trajectory, Velocity.

For abstract, see STAR 04 17.

N66-30349 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ULTRAVIOLET REFLECTIVITY OF VENUS AND JUPITER.
by D. C. Evans. May 66, 32p NASA-TM-X-55526, X-613-66-172

Descriptors: *Jupiter (planet), *Ultraviolet spectrograph, *Venus, Absorption, Aerobee rocket, Atmosphere, Cloud, Geometry, Low, Rayleigh scattering, Reflection, Resolution, Scattering, Spectral, Spectrogram, Spectrograph, Spectrum, Surface, Ultraviolet.

For abstract, see STAR 04 17.

N66-30355 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A COMPARISON BETWEEN INTENSITIES OF A GEOS-A FLASH SEQUENCE AS RECORDED BY PHOTOGRAPHIC AND ELECTRO-OPTICAL TECHNIQUES.
by S. H. Genatt. May 66, 20p NASA-TM-X-55532, X-524-66-201

Descriptors: *Electro-optics, *Geodetic satellite, *Photographic recording, Brightness, Camera, Comparison, Densitometer, Flash, Intensity, Measurement, Oscilloscope, Photography, Recording, Sequence, Simultaneous, Telescope, Trace.

For abstract, see STAR 04 17.

N66-30359 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ROCKET SPECTROHELIOGRAPH FOR THE MG II AT 2802.7 ANGSTROM.
by K. Fredga. May 66, 49p NASA-TM-X-55536, X-614-66-213

Descriptors: *Solar radiation observation, *Spectroheliograph, Birefringence, Camera, Filter, Magnesium, Monochromatic, Observation, Photography, Radiation, Rocket, Solar, Spectrum, Telescope, Ultraviolet.

For abstract, see STAR 04 17.

N66-30394 **Field 3B**
CFSTI Prices HC$6.00 MF$1.50
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
POLARIMETRIC MEASUREMENTS OF SIMULATED LUNAR SURFACES FINAL REPORT.
by W. G. Egan, G. C. Mc coyd, and L. L. Smith. May 66, 264p NASA-CR-76169, RE-250
Contract NAS9-4942

Descriptors: *Infrared radiation, *Lunar surface, *Polarimetry, *Visible radiation, Albedo, Apollo project, Coating, Correlation, Infrared, Landing, Lunar, Polarization, Powder, Property, Radiation, Simulation, Surface, Visible.

For abstract, see STAR 04 17.

N66-30602 Field 3B
CFSTI Prices HC$1.00 MF$0.50
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
POLARIMETRIC MEASUREMENTS OF SIMULATED LUNAR SURFACES.
by W. G. Egan, and L. L. Smith. Apr 66, 14p NASA-CR-76230, RM-323J
Contract NAS9-4942
Presented At The 121st Meeting Of The Am. Astron. Soc., Nasa, Langley Res. Center, Hampton, Va., 28-31 Mar. 1966

Descriptors: *Lunar surface, *Polarization characteristics, *Surface property, Albedo, Ash, Characteristics, Coarseness, Furnace, Lunar, Particle, Polarimetry, Polarization, Porosity, Property, Roughness, Simulation, Size, Slag, Surface, Volcanic.

For abstract, see STAR 04 17.

N66-30608 Field 3B
CFSTI Prices HC$3.00 MF$0.75
Brandeis Univ., Waltham, Mass. Dept. Of Physics
FOKKER- PLANCK TREATMENT OF THE EVOLUTION OF THE GLOBULAR CLUSTER IN ENERGY AND ANGULAR MOMENTUM SPACE.
by P. D. Easton. Nov 65, 100p NASA-CR-76238
Grant NSG-540, Contract AF 19/628/-4019

Descriptors: *Fokker-planck equation, *Star field, *Velocity distribution, Angular, Cluster, Coefficient, Coupling, Derivation, Distribution, Energy, Equation, Evolution, Field, Gravitational, Homogeneity, Integration, Interaction, Loss, Mass, Momentum, Orbit, Perturbation, Star, Stellar, Velocity.

For abstract, see STAR 04 17.

N66-30859 Field 3B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LUNAR OCCULTATION AND PROVISIONAL IDENTIFICATION OF MSH 19-27.
by L. W. Brown. Mar 66, 14p NASA-TM-X-55498, X-615-66-123

Descriptors: *Lunar occultation, *Radio source, Astronomy, Identification, Lunar, Moon, Observation, Occultation, Photography, Position, Radio, Source, Star, Stellar, Tracking.

For abstract, see STAR 04 17.

N66-31364 Field 3B
CFSTI Prices HC$2.00 MF$0.50
Electro-mechanical Research, Inc., Sarasota, Fla. Telemetry Div.
STUDY OF LUNAR GEOPHYSICAL SURFACE AND SUBSURFACE PROBES FOR APOLLO APPLICATION PROGRAM. VOLUME I - SUMMARY TECHNICAL REPORT FINAL REPORT.
by A. D. Robinson. Jun 66, 33p NASA-CR-76405
Contract NAS8-20243

Descriptors: *Apollo project, *Lunar probe, *Subsurface, *Surface property, *Telemetry, Electric, Geophysics, Lunar, Nuclear, Power, Probe, Property, Requirement, Surface, Thermal, Weight.

For abstract, see STAR 04 17.

N66-31446 Field 3B
CFSTI Prices HC$7.00 MF$1.75
California Inst. Of Tech., Pasadena. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
PROCEEDINGS OF THE CALTECH-JPL LUNAR AND PLANETARY CONFERENCE.
by H. Brown, G. Muench, D. O. Muhleman, and G. J. Stanley. 15 Jun 66, 357p NASA-CR-76142, JPL-TM-33-266
Contract NSR-05-002-050
Conf. Held At Calif. Inst. Of Tech., Pasadena, 13-18 Sep. 1965 Prepared Jointly With Jpl

Descriptors: *Conference, *Jupiter (planet), *Mars (planet), *Moon, *Planetary atmosphere, *Venus, Astronomy, Atmosphere, Brightness, Carbon dioxide, Characteristics, Cloud, Composition, Data, Exploration, Field, Magnetic, Motion, Observation, Planetary, Pressure, Probe, Radar, Reflection, Scattering, Spectroscopy, Surface, Telescope, Temperature, Water.

For abstract, see STAR 04 17.

N66-31456 Field 3B
CFSTI Prices HC$7.00 MF$1.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LUNAR STRUCTURE AS DEDUCED FROM MUONG NONG TEKTITES.
by I. Adler, and J. A. Okeefe. 15 Jun 66, 10p
Caltech-jpl Lunar And Planetary Conf. 15 Jun. 1966 P 92-101 Refs (See N66-31446 18-30)

Descriptors: *Lunar composition, *Microstructure, *Tektite, Aluminum, Angle, Calcium, Chemical, Composition, Conference, Crystal, Glass, Iron, Layer, Lunar, Parallel, Pattern, Silicon, Strain, Temperature, Void.

For abstract, see STAR 04 17.

N66-31457 Field 3B
CFSTI Prices HC$7.00 MF$1.75
Maryland Univ., College Park.
RECENT RADIO OBSERVATIONS OF JUPITER.
by M. M. Komesaroff. 15 Jun 66, 11p
Caltech-jpl Lunar And Planetary Conf. 15 Jun. 1966 P 107-116 Refs (See N66-31446 18-30)

Descriptors: *Jupiter (planet), *Planetary radiation, *Radio observation, Conference, Decametric, Decimeter, Observation, Planet, Planetary, Polarization, Radiation, Radio, Satellite, Spectrum, Time, Variable.

For abstract, see STAR 04 17.

N66-31463 Field 3B
CFSTI Prices HC$7.00 MF$1.75
Johns Hopkins Univ., Baltimore, Md.
BALLOON TELESCOPE STUDIES OF VENUS.
by J. D. Strong. 15 Jun 66, 3p
Caltech-jpl Lunar And Planetary Conf. 15 Jun. 1966 P 147-150 Refs (See N66-31446 18-30)

Descriptors: *Balloon flight, *Ice, *Venus atmosphere, *Water vapor, Absorption, Atmosphere, Balloon, Carbon, Cloud, Conference, Dioxide, Flight, Reflection, Spectroscopy, Spectrum, Telescope, Vapor, Venus, Water.

For abstract, see STAR 04 17.

N66-31464 Field 3B
CFSTI Prices HC$7.00 MF$1.75
Rand Corp., Santa Monica, Calif.
COMMENTS ON THE DETECTION OF WATER AND ICE CLOUDS ON VENUS.
by D. Deirmendjian. 15 Jun 66, 5p
Caltech-jpl Lunar And Planetary Conf. 15 Jun. 1966 P 150-154 Refs (See N66-31446 18-30)

Descriptors: *Cloud physics, *Ice, *Venus atmosphere, *Water vapor, Absorption, Atmosphere, Cloud, Component, Conference, Diffusion, Earth, Flyby, Gas, Infrared, Particle, Physics, Polarimetry, Spectrum, Sunlight, Vapor, Venus, Visible, Water.

For abstract, see STAR 04 17.

N66-31477 Field 3B
CFSTI Prices HC$7.00 MF$1.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
PRELIMINARY RESULTS OF THE MARINER IV OCCULATION MEASUREMENT OF THE ATMOSPHERE OF MARS.
by D. L. Cain, F. D. Drake, V. R. Eshleman, G. Fjeldbo, and A. J. Kliore. 15 Jun 66, 10p
Contracts NAS7-100, NGR-05-020-65
Caltech-jpl Lunar And Planetary Conf. 15 Jun. 1966 P 257-266 Refs (See N66-31446 18-30)

Descriptors: *Mariner iv space probe, *Mars atmosphere, *Occultation, *Radio observation, Analysis, Atmosphere, Carbon dioxide, Change, Conference, Data, Doppler effect, Frequency, Measurement, Observation, Phase, Radio, Shift, Spectroscopy.

For abstract, see STAR 04 17.

N66-31478 Field 3B
CFSTI Prices HC$7.00 MF$1.75
Stanford Univ., Calif.
PRELIMINARY RESULTS OF THE MARINER IV RADIO OCCULTATION MEASUREMENTS OF THE UPPER ATMOSPHERE OF MARS.
by D. L. Cain, F. D. Drake, V. R. Eshleman, G. Fjeldbo, and A. J. Kliore. 15 Jun 66, 6p
Contracts NAS7-100, NGR-05-020-065
Caltech-jpl Lunar And Planetary Conf. 15 Jun. 1966 P 267-272 Refs (See N66-31446 18-30)

Descriptors: *Mariner iv space probe, *Mars atmosphere, *Occultation, *Radio observation, *Upper atmosphere, Altitude, Analysis, Atmosphere, Change, Conference, Data, Density, Electron, Ionosphere, Mass, Model, Observation, Phase, Profile, Radio, Reaction, Temperature, Upper.

For abstract, see STAR 04 17.

N66-31944 Field 3B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE ATMOSPHERE OF MARS - A DERIVATION OF ENGINEERING AND DESIGN PARAMETERS.
by W. T. Roberts, and G. S. West. 29 Jun 66, 38p NASA-TM-X-53484

Descriptors: *Atmosphere model, *Density distribution, *Mars atmosphere, *Planetary atmosphere, Argon, Atmosphere, Carbon, Density, Dioxide, Distribution, Flyby, Mariner iv space probe, Mars, Model, Nitrogen, Planetary, Program, Temperature.

For abstract, see STAR 04 17.

N66-31973 Field 3B
CFSTI Prices HC$2.00 MF$0.50
Technische Univ., Berlin (West Germany). Institut Fuer Raumfahrttechnik.
PROJECT STUDY OF A COMET PROBE.
Projektstudie Einer Kometensonde
by H. Scheel. 22 Apr 66, 27p TUB-IR-1966/1
In German Presented At 7th Dgrr Symp.

Descriptors: *Comet, *Optical rangefinder, *Space probe, *Telecommunication, Astrophysics, Cylinder, Design, Flyby, Meteor, Optics, Penetration, Probability, Probe, Rangefinder, Sensor, Space, Stabilization, System.

For abstract, see STAR 04 17.

N66-32112 Field 3B
CFSTI Prices HC$2.50 MF$0.75
California Inst. Of Tech., Pasadena.
NUCLEOSYNTHESIS IN THE EARLY HISTORY OF THE SOLAR SYSTEM.
by D. S. Burnett, W. A. Fowler, and F. Hoyle. 31 May 65, 72p NASA-CR-67873

Contracts NGR-05-002-028, NONR-220/47/
Aid Preprint Ser. In Nucl. Geophys.

Descriptors: *Astrophysics, *Nucleosynthesis, *Solar system, Beryllium, Boron, Calculation, Deuterium, Evolution, Flux, Lithium, Model, Neutron, Nuclear, Solar, Spallation, Synthesis, System.

For abstract, see STAR 04 17.

N66-32113 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
California Inst. Of Tech., Pasadena.
ON THE FORMATION OF ELLIPTICAL GALAXIES.
by F. Hoyle, and J. V. Narlikar. 1965, 18p
NASA-CR-67786
Contracts NGR-05-002-028, NONR-220/47/
Aid Preprint Ser. In Nucl. Astrophys.

Descriptors: *Astrophysics, *Cosmology, *Galaxy, Distribution, Ellipticity, Expansion, Formation, Mass, Theory.

For abstract, see STAR 04 17.

N66-32193 **Field 3B, 14E**
CFSTI Prices HC$3.00 MF$1.00
Kyoto Univ. (Japan).
PHOTOGRAPHIC ATLAS OF THE MOON, SECOND EDITION, 1964.
by A. Hattori, and S. Miyamoto. 1964, 141p
Contrib. From Inst. Of Astrophysics And Kwasan Obs. No. 137

Descriptors: *Astronomical map, *Lunar photograph, *Selenography, Astronomy, Astrophysics, Feature, Geology, Lunar, Map, Photograph, Plate, Section, Surface, Telescope.

For abstract, see STAR 04 17.

N66-32298 **Field 3B**
CFSTI Prices HC$2.50 MF$0.50
Harvard Coll. Observatory, Cambridge, Mass.
A STUDY OF THERMAL RESPONSE OF THE LUNAR SURFACE AT THE LANDING SITE DURING THE DESCENT OF THE LUNAR EXCURSION MODULE (LEM).
by J. T. Holland, and H. C. Ingrao. 1 Apr 66, 58p
NASA-CR-76648
Grant NSG-64-60
Prepared For Arthur D. Little, Inc. And Nasa

Descriptors: *Convective heat transfer, *Exhaust nozzle, *Landing site, *Lunar excursion module (lem), *Lunar surface, *Radiative heat transfer, Computer, Convection, Excursion, Exhaust, Heat, Landing, Lem, Lunar, Module, Nozzle, Program, Radiative, Response, Site, Surface, Thermal, Transfer.

For abstract, see STAR 04 17.

N66-32300 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Bellcomm, Inc., Washington, D. C.
PHOTOMETRY AND POLARIMETRY OF THE MOON AND THEIR RELATIONSHIP TO THE PHYSICAL PROPERTIES OF THE LUNAR SURFACE SUMMARY.
by C. A. Pearse. 23 Aug 63, 8p NASA-CR-76695, TR-63-211-7
Contract NASW-417

Descriptors: *Lunar surface, *Photometry, *Physical property, *Polarimetry, Layer, Light, Lunar, Matrix, Model, Moon, Physical, Polarization, Property, Reflection, Surface.

For abstract, see STAR 04 17.

N66-32302 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Southwest Center For Advanced Studies, Dallas, Tex.
THE ATMOSPHERE OF MARS.
by F. S. Johnson. 1966, 16p NASA-CR-76666
Grant NSG-269
Presented At The Cospar 7th Intern. Space Sci. Symp., Vienna, 10-19 May 1966

Descriptors: *Ionosphere, *Mariner iv space probe, *Mars atmosphere, Atmosphere, Atom, Carbon, Composition, Dioxide, F- 2 layer, Ice, Mars, Oxygen, Pressure, Scattering, Sunlight.

For abstract, see STAR 04 17.

N66-32317 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
Lund Inst. Of Tech. (Sweden).
COMPARISONS BETWEEN MK, HD AND HDE SPECTRAL CLASSES.
by U. Lindoff, and G. Lynga. 1966, 38p
Presented At Royal Physiographic Soc., 14 Mar. 1966 Its Acta Univ. Lundensis, Sectio Ii, No. 22

Descriptors: *Spectral analysis, *Star, *Stellar spectrum, Analysis, B star, Classification, Comparison, Galaxy, Interstellar, Latitude, Line, Luminosity, Magnitude, Spectral, Spectrum, Stellar, System.

For abstract, see STAR 04 17.

N66-32409 **Field 3B**
CFSTI Prices HC$2.50 MF$0.75
Kyoto Univ. (Japan).
METEOROLOGICAL OBSERVATIONS OF MARS DURING THE 1965 OPPOSITION.
by S. Miyamoto. 1965, 68p
Contrib. From The Inst. Of Astrophys. And Kwasan Obs. No. 141

Descriptors: *Mars (planet), *Meteorology, *Northern hemisphere, Circulation, Cloud, Epoch, Hemisphere, North, Observation, Opposition, Polar, Spring, Summer, Surface, Transition.

For abstract, see STAR 04 17.

N66-32428 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
STUDY OF LUNAR EARTHSHINE BY PHOTOELECTRIC PHOTOMETRY SEMIANNUAL REPORT, 1 NOV. 1965 - 30 APR. 1966.
by F. A. Franklin. Jun 66, 18p NASA-CR-76753
Contract NGR-09-015-025

Descriptors: *Earth albedo, *Lunar luminescence, *Photoelectric photometry, Albedo, Crescent, Earth, Light, Luminescence, Lunar, Moon, Observation, Phase, Photoelectric, Photometry, Reflection, Scattering, Technique.

For abstract, see STAR 04 17.

N66-32439 **Field 3B**
CFSTI Prices HC$2.50 MF$0.50
Iit Research Inst., Chicago, Ill. Astro Sciences Center.
SCIENTIFIC OBJECTIVES OF DEEP SPACE INVESTIGATIONS - VENUS.
by P. Dickerman. May 66, 57p NASA-CR-76766, P-7
Contract NASR-65/06/

Descriptors: *Deep space, *Environment model, *Planetary environment, *Venus, Astronomical, Data, Deep, Environment, Instrumentation, Measurement, Mission, Mode, Model, Orbital, Physical, Planetary, Science, Space.

For abstract, see STAR 04 17.

N66-32660 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
Lund Observatory (Sweden).
INVESTIGATIONS OF A REGION IN MONOCEROS. PART I - DETERMINATION OF MONOCHROMATIC MAGNITUDES AND HYDROGEN LINE DEPTHS OF B-TYPE, A-TYPE, AND F-TYPE STARS.
by B. Karlsson. 1966, 28p
Its Acta Univ. Sectio Ii, 1966, No. 4

Descriptors: *Astrophysics, *Spectral line, *Star, Galaxy, Hydrogen, Line, Magnitude, Method, Monochromatic, Spectral.

For abstract, see STAR 04 17.

N66-32668 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
California Univ., Los Angeles. Inst. Of Geophysics And Planetary Physics.
VARIATIONS IN THE INTERPLANETARY MAGNETIC FIELD - MARINER 2. PART 2 - INTERPRETATION IN TERMS OF HYDROMAGNETIC WAVES.
by P. J. Coleman Jr. 5 May 66, 46p NASA-CR-76943
Grant NSG-249
Its Publ.-504

Descriptors: *Interplanetary magnetic field, *Mariner ii space probe, Coherence, Density, Field, Hydromagnetic, Interplanetary, Magnetic, Magnetohydrodynamic wave, Model, Phase, Plasma, Ratio, Sun, Value, Variation, Velocity, Wave.

For abstract, see STAR 04 17.

N66-36806 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
Rice Univ., Houston, Tex. Dept. Of Space Science.
SATELLITE OBSERVATIONS OF PARTICLE FLUXES AND ATMOSPHERIC EMISSIONS.
by B. J. Obrien. 1966, 45p NASA-CR-77908
Contracts NAS6-1061, NONR-4964/1/
Presented At Nato Advanced Study Inst. On Aurora And Airglow, Keele, England, Aug. 1966

Descriptors: *Auroral zone, *Particle flux, *Precipitation particle measurement, *Satellite observation, Airglow, Altitude, Aurora, Conference, Emission, Excitation, Flux, Light, Measurement, Observation, Particle, Photometry, Precipitation, Satellite, Zone.

For abstract, see STAR 04 22.

N66-37047 **Field 3B**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LUNAR THERMAL ENVIRONMENT.
by D. W. Gates, J. K. Harrison, B. P. Jones, and J. R. Watkins. 26 Aug 66, 97p NASA-TM-X-53499

Descriptors: *Lunar temperature, *Thermal environment, Albedo, Color, Environment, Infrared, Light, Luminescence, Lunar, Measurement, Microwave, Moon, Photometry, Polarization, Property, Surface, Temperature, Thermal.

For abstract, see STAR 04 22.

N66-37214 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Radioscience Lab.
THE ATMOSPHERE OF MARS - A COMPARISON OF DIFFERENT MODEL STUDIES BASED ON MARINER IV OCCULTATION DATA SCIENTIFIC REPORTS 16 AND 3.
by V. R. Eshleman, G. Fjeldbo, and W. C. Fjeldbo. Jun 66, 24p NASA-CR-78134, SEL-66-054
Contract NGR-05-020-065, Grant NSG-377

Descriptors: *Atmosphere model, *Heat budget, *Mars atmosphere, Atmosphere, Budget, Emergence, Heat, Ionosphere, Layer, Mariner iv space probe, Mars (planet), Measurement, Model, Occultation, Planetary, Thermosphere, Upper.

For abstract, see STAR 04 22.

N66-37376 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Naval Research Lab., Washington, D.C. E. O. Hulburt Center For Space Research.
RECENT EXTREME ULTRAVIOLET SOLAR SPECTRA AND SPECTROHELIOGRAMS.
by W. E. Austin, J. D. Purcell, C. B. Snider, R. Tousey, and K. G. Widing. 1966, 20p NASA-CR-78162
NASA ORDER R-09-029-036
Presented At The Cospar Meeting, Vienna, 10-19 May 1966 Submitted For Publication

Descriptors: *Solar spectrum, *Spectroheliograph, *Ultraviolet, Activity, Chromosphere, Corona, Emission, Extreme, Line, Photography, Plage, Quiet, Solar, Spectrum, Sun, X-ray.

For abstract, see STAR 04 22.

N66-37470 **Field 3B, 17E**
CFSTI Prices HC$1.00 MF$0.50
European Space Research Organization, Paris (France).
ON THE THEORY OF ULTRAVIOLET RADIATION.
by S. R. Pottasch. May 66, 16p ESRO-SM-56
Lecture Given At Esro Summer School, Alpbach, Austria, 20 Jul. - 12 Aug. 1965

Descriptors: *Solar atmosphere, *Temperature measurement, *Ultraviolet radiation, Atmosphere, Chromosphere, Corona, Density, Determination, Electron, Electron density, Height, Measurement, Outer, Radiation, Scattering, Solar, Spectrum, Sun, Temperature, Ultraviolet.

For abstract, see STAR 04 22.

N66-37487 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Royal Inst. Of Tech., Stockholm (Sweden). Div. Of Plasma Physics.
SOLAR MAGNETIC FIELDS.
by H. Alfven. 26 Mar 65, 25p REPT.-65-17
Submitted For Publication

Descriptors: *Magnetic measurement, *Solar magnetic field, *Zeeman effect, Activity, Atmosphere, Conference, Corona, Current, Electric, Electromagnetism, Field, Flare, Flux, Force, Free, Homogeneity, Inhomogeneity, Longitudinal, Magnetic, Magnetograph, Measurement, Model, Photosphere, Regularity, Solar, Sun, Sunspot, Transverse.

For abstract, see STAR 04 22.

N66-37544 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
Lincoln Lab., Mass. Inst. Of Tech., Lexington.
RADAR STUDIES OF THE MOON QUARTERLY PROGRESS REPORT NO. 3, 1 MAY - 31 JUL. 1966.
19 Sep 66, 42p NASA-CR-78370
Contract NSR-22-009-106

Descriptors: *Lunar surface, *Radar measurement, Angle, Backscatter, Doppler effect, Echo, Mapping, Moon, Observation, Polarization.

For abstract, see STAR 04 22.

N66-37562 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Dearborn Observatory.
ON THE MASS-LUMINOSITY RELATION FOR GALAXIES.
by S.-S. Huang. 1965, 8p NASA-CR-78384
Contract NGR-14-007-041

Descriptors: *Luminosity, *Neutral element, *Spiral galaxy, *Stellar mass, Hydrogen, Irregularity, Mass, Neutral, Relation, Spiral, Star, System.

For abstract, see STAR 04 22.

N66-37567 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
Northwestern Univ., Evanston, Ill.
ASTROPHYSICS.
1966, 28p NASA-CR-78357
Contract NGR-14-007-041
Submitted For Publication

Descriptors: *Astrophysics, *History, *Photometry, *Spectroscopy, Development, Emission, Line, Radial, Spectral, Spectroheliograph, Stellar, Telescope, Velocity, Zeeman effect.

For abstract, see STAR 04 22.

N66-37584 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Dearborn Observatory.
A THEORY OF THE ORIGIN AND EVOLUTION OF CONTACT BINARIES.
by SU.-S.Huang. 1965, 24p NASA-CR-78338
Contract NGR-14-007-041
Submitted For Publication

Descriptors: *Binary star, *Stellar evolution, Angular, Binary, Cluster, Contact, Dissipation, Ejection, Mass, Momentum, Orbital, Origin, Star, Theory.

For abstract, see STAR 04 22.

N66-37605 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Dearborn Observatory.
ON THE MASS-LUMINOSITY RELATION FOR SPIRAL GALAXIES.
by S.-S. Huang. 1965, 8p NASA-CR-72899
Contract NGR-14-007-041
Submitted For Publication

Descriptors: *Luminosity, *Spiral galaxy, *Stellar mass, Dust, Formation, Hydrogen, Hypothesis, Irregularity, Least, Neutral, Photographic, Relation, Solution, Square, Star.

For abstract, see STAR 04 22.

PB-173 189 **Field 3B, 6G, 18H**
CFSTI Prices: HC$9.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
EMISSIONS GAMMA DE QUELQUES METEORITES ET ROCHES TERRESTRES: EVALUATION DE LA RADIOACTIVITE DU SOL LUNAIRE (Gamma-Emissions of Some Meteorites and Terrestrial Rocks; Evaluation of Lunar Soil Radioactivity).
Doctoral thesis in French,
by Daniel Nordemann. 1966, 93p CEA-R-3017
Text in French; Attached Summary in English.

Descriptors: (*Lunar environment, Gamma emission), (*Meteorites, Gamma emission), (*Rock (Geology), *Gamma emission), Moon, Soils, Gamma-ray spectroscopy, Cosmic rays, Radioactive isotopes, Radioactive decay, France.

The gamma-emissions of some terrestrial rocks and meteorites (Bogou, Eagle-Station, Granes and Dosso) were studied by quantitative low background gamma-ray spectrometry. These measurements and their interpretation lead to the evaluation of the possible gamma-emissions of several models of lunar soils. (Author)

AD-640 871 **See Field 20H**

AD-641 296 **See Field 7D**

N66-31202 **See Field 4A**

N66-31480 **See Field 14E**

N66-37496 **See Field 4A**

N66-37509 **See Field 8N**

3C. CELESTIAL MECHANICS

AD-641 128 **Field 3C, 12A**
CFSTI Prices: HC$3.00 MF$0.75
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
TROJAN ORBITS. II. BIRKHOFF'S NORMALIZATION,
by Andre Deprit, Jacques Henrard, and A. R. M. Rom. Aug 66, 61p D1-82-0564, Mathematical note-481
See also AD-612 265.

Descriptors: (*Celestial mechanics, *N-body problem), Hamiltonian, Power series, Functions, Transformations (Mathematics), Fourier analysis.

Identifiers: Trojan, Restricted three body problem, Birkhoff's normalization.

In the Restricted Problem of Three Bodies for the system Sun-Jupiter, all terms of short and long period up to degree 13 are eliminated from the Hamiltonian expanded in power series in the neighborhood of an equilateral center of libration. The normalizing canonical transformation expresses the Cartesian phase variables as double Fourier series in two angle coordinates whose coefficients are power series in the square roots of two action momenta. In the normalized part of the transformed Hamiltonian, the angle coordinates are ignorable. It is shown how such a Birkhoff's normalization can be implemented automatically on a computer. As a first application, the characteristic exponents along the singular families of long and short period orbits originating at the equilibrium are developed as power series of the orbital parameter. (Author)

N66-30353 **Field 3C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPUTATION OF THE LONG RANGE MOTION OF A LUNAR SATELLITE.
by I. J. Cole. May 66, 42p NASA-TM-X-55530, X-547-66-196

Descriptors: *Harmonic analysis, *Lunar satellite, *Satellite perturbation, Analysis, Energy, Harmonic, Integral, Long, Lunar, Periodic, Perturbation, Range, Satellite.

For abstract, see STAR 04 17.

N66-30357 **Field 3C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
USE OF MEAN ELEMENTS TO CALCULATE THE POSITION OF THE SUN, MOON AND EARTH.
by R. J. Sandifer. Jan 66, 45p NASA-TM-X-55534, X-507-66-209

Descriptors: *Earth, *Ephemeris time, *Moon, *Orbital element, *Sun, Algorithm, Calculation, Coefficient, Computer, Element, Ephemeris, Formula, Mean, Numerical, Orbital, Time, Use.

For abstract, see STAR 04 17.

N66-30360 Field 3C
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE LIBRATION OF A LUNAR SATELLITE.
by T. L. Felsentreger, and D. Fisher. May 66, 28p
NASA-TM-X-55537, X-547-66-238

Descriptors: *Energy equation, *Libration, *Lunar satellite, *Motion equation, Circulation, Cycle, Energy, Equation, Expansion, Lunar, Motion, Pendulum, Period, Perturbation, Phase, Rotation, Satellite, Space, Theory.

For abstract, see STAR 04 17.

4. ATMOSPHERIC SCIENCES

AD-453 025 See Field 5B

4A. ATMOSPHERIC PHYSICS

AD-640 574 Field 4A
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
VARIABILITY OF WISCONSIN AREA ATMOSPHERIC LIGHT TRANSMISSION.
Technical rept.,
by Andrew Petriw, and Israel Cantor. Jun 66, 29p
ECOM-2728
Proj. DA-1V0-14501-B-53A
Task 1V0-14501-B-53A-13

Descriptors: (*Atmosphere, Light transmission), Wisconsin, Scintillation, Attenuation.

The direct component portion of a large quantity of atmospheric light-transmission data being analyzed exhibits rather large fluctuations which have generated variations in corresponding computed attenuation coefficients. This report describes the results of comparisons between two different sample sizes of the data, made in an effort to reduce the degree of variation. The report also shows the magnitude of variation that occurred during similar transmission conditions. (Author)

AD-640 610 Field 4A
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
JOINT RADAR AND AEROLOGICAL OBSERVATIONS IN THE LOWER 1.5-KM LAYER OF THE ATMOSPHERE,
by G. B. Brylev, I. V. Vasilchenko, V. I. Selitskaya, and A. A. Federov. 18 Aug 66, 24p TG-230-T496
Contract NOw-62-0604
TT-66-61159
Trans. of Glavnaya Geofizicheskaya Observatoriya, Laningrad. Trudy (USSR), n173 p76-87 1965.

Descriptors: (*Troposphere, Atmospheric motion), (*Atmospheric motion, *Radar reflections), Meteorological radar, Meteorological parameters, Convection (Atmospheric), USSR.

The results of joint radar and aerological observations in the lower 1.5-km layer of the atmosphere are examined. A connection between clear-sky radar returns and convective and turbulent motion in the atmosphere is demonstrated. (Author)

AD-640 691 Field 4A
Not available from CFSTI.
Pennsylvania State Univ., University Park.
ONE-DIMENSIONAL SPECTRA DERIVED FROM AN AIRBORN HOT-WIRE ANEMOMETER.
Revised ed.,
by F. R. Payne, and J. L. Lumley. 27 Nov 65, 6p
Research supported in part by Bureau of Naval Weapons, Air Force Cambridge Research Lab. Revision of manuscript received 15 Dec 64.
Availability: Published in Quarterly Journal of the Royal Meteorological Society v92 n393 p397-401 Jul 1966.

Descriptors: (*Atmospheric motion, *Anemometers), Meteorological parameters, Measurement.

Velocity fluctuations in the flight path direction were measured by a single hot-wire mounted in the wing tip of a light aircraft. Magnetic tape recordings were later analysed by standard means to produce one-dimensional spectra. These spectra exhibited the (-5/3) power law behaviour over a range of several decades of wavenumber. Local isotropy was verified in the horizontal plane by flight paths into and perpendicular to the mean wind. (Author)

AD-640 722 Field 4A
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
REGULAR VARIATIONS OF THE CONTENT OF ELECTRONS IN THE LOWER PART OF LAYER F2 OF THE IONOSPHERE AT THE MIDDLE LATITUDES,
by L. A. Shchepkin. 30 Jun 66, 20p FTD-MT-65-489
TT-66-62493
Edited machine trans. of mono. Ionosfery i Rasprostraneniya Radiovoln, Moscow, 1963 p66-74.

Descriptors: (*Ionosphere, *Electron density), Distribution, Analysis of variance, USSR.

AD-640 776 Field 4A
Not available from CFSTI.
Environmental Science Services Administration, Boulder, Colo. Inst. for Telecommunication Sciences/Aeronomy.
OBSERVATIONS OF SUDDEN IONOSPHERIC FREQUENCY DEVIATIONS AT WIDELY SEPARATED PLACES,
by D. M. Baker, K. Davies, and L. Grimes. 1966, 3p
Availability: Published in Nature v210 n5033 p253-5 Apr 16 1966.

Descriptors: (*Ionospheric disturbances, Frequency), (*Solar flares, Ionospheric disturbances), Analysis of variance, Solar radiation.

The purpose of the report is to present a few examples as evidence to show that these frequency deviations are produced directly by fluctuations in solar ionizing radiation at the time of a flare rather than by some form of local ionospheric disturbance.

AD-640 825 Field 4A
CFSTI Prices: HC$3.00 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
SEVEN-INCH HARP GUN-LAUNCHED VERTICAL PROBE SYSTEM: INITIAL DEVELOPMENT.
Memorandum rept.,
by Eugene D. Boyer, and Leonard C. MacAllister. Jul 66, 70p BRL-MR-1770
RDT/E-1A011001B021

Descriptors: (*Atmospheric sounding, Probes), Sabot projectiles, Upper atmosphere, Guns.

Identifiers: Harp.

The description of an upper atmosphere sounding system, based on a modified 175 mm gun, is given. The 175 mm gun tube is extended and smooth bored, and a T76 mount, modified to permit vertical fire is utilized. The gun is used to launch subcaliber, fin-stabilized, center-saboted projectiles. During initial tests, a prototype projectile with a payload volume of fifty cubic inches attained a maximum altitude of 260,000 feet. A smaller version of the projectile, with a potential payload volume of about fifteen cubic inches reached an altitude of 330,000 feet. (Author)

AD-640 840 Field 4A
CFSTI Prices: HC$3.00 MF$0.50
University Coll., London (England). Dept. of Physics.
DETERMINATION OF AIR DENSITY, TEMPERATURE AND WINDS AT HIGH ALTITUDES.
Annual summary rept. no. 2,
by G. V. Groves, R. W. Procunier, D. P. McDermott, and D. Rees. Mar 66, 55p Scientific-3
Contract AF 61 (052)-781
AFCRL-66-637

Descriptors: (*Atmospheric sounding, High altitude), Meteorological parameters, Atmospheric temperature, Wind, Sounding rockets, Acoustic equipment, Recording systems, Optical equipment, Experimental data, Great Britain.

Techniques were developed for extending wind and temperature measurements to great heights. Grenade and TMA payloads used on Skylark, Nike-Cajun and Nike-Apache rockets are described. A multiplex system for acoustic recording comprising seven control frequencies amplitude modulated with pressure variations and ultra-violet and magnetic tape recording systems is also described. This system has the advantage of removing electrical noise encountered over long transmission lines and is capable of electronically reproducing signals. Its use has enabled the maximum altitude of detection of 355 gm grenades to be extended to 107 km. Details of F24 camera coverage and operation for the optical triangulation of grenades for the Sardinia firings in September 1965 are given. The development of specialised optical equipment is reviewed, and an analysis of data obtained at Eglin AFB, Florida and at Sardinia during 1965 is given. A summary is presented of the theoretical developments necessary for the reduction of data, and the next stages of the research are discussed.

AD-640 906 Field 4A
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
CHARGED PARTICLE TEMPERATURES AND ELECTRON THERMAL CONDUCTIVITY IN THE UPPER ATMOSPHERE,
by Peter M. Banks. 15 Jul 66, 32p Scientific-276
Grant NsG-134-61

Descriptors: (*Upper atmosphere, Electrical properties), (*Electrons, Thermal conductivity), (*Charged particles, Temperature), Plasma medium, Ionosphere.

The thermal conductivity of the electron gas plays an important part in determining the profiles of electron and ion temperature in the upper atmosphere. Previous calculations have been based upon the thermal conductivity derived for a fully ionized gas. In aeronomic conditions however, the contribution made by neutral gas particles must be introduced. In the paper an analysis is made of the effect of electron-neutral particle collisions and an appropriate expression is developed for the electron thermal conductivity which is applicable to a weakly ionized plasma. It is found that a correction term needed to include the effect of neutral particles is of importance during both day and night at all altitudes below 220 km. In fact, at altitudes below 135 km it appears that the conduction term can be neglected in the electron energy balance equation. Using the derived expression for the effective electron thermal conductivity, an example of calculated temperatures characteristic of quiet solar conditions is presented. (Author)

AD-640 996 Field 4A
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.

CONCLUDING REMARKS ON IONOSPHERIC F-REGION TEMPERATURES,
by J. V. Evans. 1965, 8p JA-2548B
Contract AF 19 (628)-5167
ESD-TR-66-229
Availability: Published in Electron Density Profiles in Ionosphere and Exosphere (Proceedings of the NATO Advanced Study Institute, Finse, Norway, April 1965).

Descriptors: (*Ionosphere, *Atmospheric temperature), Upper atmosphere, Radar, Scientific satellites.

The paper summarizes briefly the state of knowledge concerning the temperature of the ionized constituents of the upper atmosphere based upon in-situ (i.e., rocket or satellite) determinations and ground-based (i.e., incoherent backscatter radar) measurements reported at the third meeting on Electron Density Profiles at Finse, Norway, 1965. (Author)

AD-640 997 **Field 4A**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
IONOSPHERIC BACKSCATTER OBSERVATIONS AT MILLSTONE HILL,
by J. V. Evans. 1965, 49p JA-2548C
Contract AF 19 (628)-5167
ESD-TR-66-230
Availability: Published in Electron Density Profiles in Ionosphere and Exosphere, (Proceedings of the NATO Advanced Study Institute, Finse, Norway, April 1965).

Descriptors: (*Ionosphere, Backscattering), Electron density, Atmospheric sounding, Atmospheric temperature, Ions.

Studies of the electron density, electron and ion temperatures in the F region have been made by means of ground-based radar observations at the Millstone Hill radar observatory. A 70-m parabolic antenna directed vertically and a 2.5-MW pulse radar operating at 440 Mcps have been employed for these measurements which were conducted for periods of 30 hrs. at approximately weekly intervals. The paper presents the results of observations extending over a period of one year from February 1963 to January 1964. The diurnal and seasonal variations of the density, electron and ion temperatures are discussed in some detail. It was found that the ratio Te/Ti achieved a maximum value approx 2.0 - 2.6 at a height of about 300 km soon after dawn irrespective of the season. There was little change in the height dependence in this ratio throughout the daylight hours, and at sunset the ratio fell with a time constant of the order of an hour. At night Te/Ti was on occasion close to unity, but more often there remained a significant difference in the temperatures at all heights. The ion temperature was found to increase with height at all times, but at night above 500 km this may be due in part to the presence of an unknown amount of He (+) ions which considerably affects the interpretation of the signal spectra. The electron temperatures were largely independent of height above about 300 km. (Author)

AD-641 053 **Field 4A**
Not available from CFSTI.
Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
ACCELERATION OF ELECTRONS NEAR THE EARTH'S BOW SHOCK AND BEYOND.
Revised ed.,
by C. Y. Fan, G. Gloeckler, and J. A. Simpson.
3 Jan 66, 21p
Grants AF-AFOSR-521-65, NsG-179-61
Proj. AF-9751
Task 975104
AFOSR-66-1332
Revision of manuscript submitted 2 Aug 65.
Availability: Published in Journal of Geophysical Research v71 n7 p1837-56 Apr 1 1966.

Descriptors: (*Upper atmosphere, Shock waves), (*Solar wind, Shock waves), (*Electrons, Upper atmosphere), Van Allen radiation belt, Plasma medium, Cosmic rays, Radiation measurement systems.

Identifiers: Magnetosphere.

Groups of electrons of energies greater than 30 kev were observed in the earth's magnetosheath, at the earth's bow shock, and in a region extending out to several earth radii beyond the shock. These measurements were made with a gold-silicon surface barrier detector on board the Imp I satellite, in the period of Nov27, 1963, to Feb 13, 1964. It was possible to estimate the spectrums of the electrons in these groups or spikes by comparing the counting rates of the respective detectors for each spike. At times of enhanced solar wind velocity having a 27-day recurrence, electron spikes were observed out to - 200,000 km, which is near satellite apogee. To investigate the origin of the electrons in spikes found in the magnetosheath, at the bow shock, and beyond the shock to distances of several earth radii, the temporal variation and energy spectrums of the electrons in the outer radiation belt, but near the magnetospheric boundary, also were analyzed. It was found that the hardening in the energy spectrum of the trapped electrons in the radiation belt follows closely the compression of the boundary of the magnetosphere controlled by the strength of the solar wind. However, this change in spectrum was not observed for the electrons in the spikes. (Author)

AD-641 174 **Field 4A, 1B**
CFSTI Prices: HC$3.00 MF$0.75
National Center for Atmospheric Research, Boulder, Colo.
BALLOONING SUPPORT FOR COSMIC-RAY EXPERIMENTS.
Technical notes,
by Robert S. Kubara, and Bertram Stiller. Sep 66, 76p NCAR-TN-20
Prepared in cooperation with Naval Research Lab., Washington, D. C. Joint United States - India International Quiet Sun Year Equatorial Expedition 6 Mar-9 Apr 1965.

Descriptors: (*Meteorological balloons, *Cosmic rays), India, Balloons, Flight paths, Nonpowered flight, Measurement.

Identifiers: IQSY.

The National Center for Atmospheric Research organized and provided program management for a balloon expedition to study cosmic rays in the vicinity of the equator during the International Quiet Sun Year (IQSY). A joint United States - India activity, the program was conducted in Hyderabad, India during the late winter and early spring of 1965. A total of 17 flights were scheduled during the period 6 March to 9 April, 1965. Of these, 13 were successful, three were ground failures, and one balloon burst during ascent. The heaviest payload flown weighed 2858 lb. All scientific packages scheduled were successfully flown and recovered. (Author)

AD-641 175 **Field 4A**
CFSTI Prices: HC$6.00 MF$1.25
Northeastern Univ., Boston, Mass.
MOTION INDUCED DISTURBANCES OF IONIZED GASES.
Final rept. 1 Oct 64-1 Jul 66,
by Harold R. Raemer. 1 Jul 66, 217p
Contracts AF 19 (628)-4325, ARPA Order-42
Proj. AF-4984
AFCRL-66-636

Descriptors: (*Ionospheric disturbances, Analysis), Atmospheric motion, Mathematical models, Differential equations, Physical properties, Gases, Plasma medium, Propagation.

The research is ultimately directed toward an improved understanding of wave disturbances in the ionosphere. Particular emphasis is placed on construction of very general mathematical models for analysis of ionospheric wave disturbances. The model discussed is one in which the ionosphere is described as a linearized electron-ion-neutral gas that is vertically non-uniform in the static parameters, eg. pressures, densities, collision frequencies, etc. and which includes the effects of the earth's magnetic field. Analytical and numerical methods of solving the system of coupled differential equations arising from the formulation are discussed. A computer program for solving these equations is described. Also discussed are degenerate subcases that are more easily solved and are useful in interpreting the more general results. Generalizations of the model to include some of the effects of viscosity and heat conduction are also treated. (Author)

AD-641 204 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
DIFFUSION MODEL OF LOW ENERGY CHARGED PARTICLES ALONG OPEN FIELD LINES,
by Joseph M. Grebowsky. 30 Jul 66, 40p
Scientific-277
Contract AF 19 (628)-4014, Grant NSF-GP-5611
Proj. AF-8605
Task 860502
AFCRL-66-671

Descriptors: (*Charged particles, Diffusion), (*Upper atmosphere, Charged particles), Plasma medium, Protons, Electrons, Magnetic fields.

Just after dayside connection of the field lines, there is a discontinuity in charged particle densities which yields a negative potential on the interplanetary side. The electrons travel a distance comparable to the size of the magnetosphere in a few minutes--a time much smaller than the period of the field line circulation. Thus the electrons can be treated independently of time. However, a time dependent study of the proton motions must be considered. Using a step function for the proton distribution of velocities, the magnitude of the electric field potential determined from quasineutrality is of the order of volts. The resulting potential profile implies that some electrons will be trapped between the low altitude magnetic mirror and an electric potential wall as the field line travels toward the nightside. It also appears that spikes in electron density propagate away from the initial discontinuity. (Author)

AD-641 213 **Field 4A**
Not available from CFSTI.
Stanford Univ., Calif. Stanford Electronics Labs.
AN ANISOTROPIC ELECTRON VELOCITY DISTRIBUTION FOR THE CYCLOTRON ABSORPTION OF WHISTLERS AND VLF EMISSIONS.
Revised ed.,
by H. Guthart. 21 Jun 65, 15p
Grant AF-AFOSR-783-65
Proj. AF-9768
Task 976801
AFOSR-66-1074
Revision of manuscript submitted 4 May 65.
Availability: Published in Radio Science Journal of Research NBS/USNC-URSI v69D n11 p1403-15 Nov 1965.

Descriptors: (*Whistlers, Absorption), (*Upper atmosphere, Atmospheric electricity), Electrons, Velocity, Distribution, Cyclotrons, Very low frequency, Damping.

In 1962, Scarf proposed cyclotron absorption as the physical mechanism explaining the high-frequency cutoff of nose whistlers. Using the Scarf proposal, two anisotropic electron velocity distributions for the magnetosphere are assumed and the complex refractive index is evaluated for each. The transverse (with respect to the ambient earth's field) velocity distribution in each case is assumed

Maxwellian. The first longitudinal distribution of velocities considered is Maxwellian to several mean square velocities and then is proportional to 1/v. The cyclotron damping term is then evaluated; however, upon investigation, the rate of change of whistler damping with frequency is found to be insufficiently rapid to agree with the observed whistler cutoff. The second velocity distribution considered is a double-humped Maxwellian, i.e., a thermal electron distribution, and a resonant electron stream. This distribution allows for cyclotron absorption and, at the same time, is consistent with the whistler dispersion and attenuation. Arising from the analysis of the double-humped Maxwellian distribution is a transverse instability developed by Bell and Buneman which leads to VLF emissions. The relative importance of cyclotron damping vis-a-vis VLF emissions is examined and a qualitative explanation of some whistler-induced emissions is suggested. (Author)

AD-641 214 **Field 4A**
Not available from CFSTI.
Stanford Univ., Calif. Stanford Electronics Labs.
NOSE WHISTLER DISPERSION AS A MEASURE OF MAGNETOSPHERE ELECTRON TEMPERATURE.
Revised ed.,
by H. Guthart. 21 Jun 65, 9p
Grant AF-AFOSR-783-65
Proj. AF-9768
Task 976801
AFOSR-66-1075
Revision of manuscript submitted 4 May 65.
Availability: Published in Radio Science, Journal of Research, NBS/USNC-URSI v69D n11 p1417-24 Nov 1965.

Descriptors: (*Whistlers, Scattering), (*Upper atmosphere, *Atmospheric temperature), Electron density.

The fractional deviation of nose whistler group delay from the zero-temperature model was calculated assuming a Maxwellian magnetosphere and a gyrofrequency electron density distribution; i.e., the electron density varies as the inverse cube with distance from the earth's center. The thermal correction to the zero-temperature group refractive index was inserted into the nose-whistler group delay integral to determine the modified group delay. Significant deviations from the zero-temperature group delay for frequencies above the nose frequency were calculated. Since deviations from the zero-temperature dispersion of a few percent are readily discernible, nose whistler data should provide at least an estimate of the upper bound on magnetosphere temperature. Twenty-three whistlers were analyzed and an upper bound on magnetosphere temperature of 2 (104)K was determined. (Author)

AD-641 215 **Field 4A**
Not available from CFSTI.
Stanford Univ., Calif. Stanford Electronics Labs.
AN INTERPRETATION OF TRANSVERSE WHISTLERS,
by I. Kimura, R. L. Smith, and Neil M. Brice. 2 Jul 65, 7p
Grant AF-AFOSR-783-65
Proj. AF-9768
Task 976801
AFOSR-66-0546
Prepared in cooperation with Carleton Univ., Ottawa (Ontario).
Availability: Published in Journal of Geophysical Research v70 n23 p5961-6 Dec 1 1965.

Descriptors: (*Whistlers, Propagation), (*Ionosphere, Whistlers), Reviews, Canada.

The whistlers with anomalous dispersion reported by Carpenter and Dunckel (1965) are interpreted as follows: The constant dispersion (independent of latitude) arises from QL propagation in a field-aligned duct. The time delay, which is approximately independent of frequency, arises from subsequent QT propagation. It varies linearly with latitude because the length of the QT-ray path varies linearly with latitude. Previously reported phenomena such as the subprotonospheric whistler (Smith, 1964) and lower-hybrid-resonance emissions (Brice and Smith, 1965) have drawn attention to transverse propagation of VLF in the ionosphere. However, the name transverse whistler seems particularly appropriate for the whistlers discussed above since their unusual characteristic arises from persistent QT propagation. Since, as was pointed out by Hines (1957), transverse propagation is possible only when ion effects are included, these whistlers, by providing evidence of transverse propagation, implicitly provide evidence of the importance of ion effects on propagation. (Author)

AD-641 216 **Field 4A**
Not available from CFSTI.
Stanford Univ., Calif. Stanford Electronics Labs.
WHISTLER STUDIES OF THE PLASMAPAUSE IN THE MAGNETOSPHERE. 2. ELECTRON DENSITY AND TOTAL TUBE ELECTRON CONTENT NEAR THE KNEE IN MAGNETOSPHERIC IONIZATION.
Revised ed.,
by J. J. Angerami, and D. L. Carpenter. 1 Nov 65, 17p
Grant AF-AFOSR-783-65
Proj. AF-9768
Task 976802
AFOSR-66-1082
Revision of manuscript submitted 24 Sep 65.
Availability: Published in Journal of Geophysical Research v71 n3 p711-25 Feb 1 66.

Descriptors: (*Whistlers, *Upper atmosphere), (*Electron density, Upper atmosphere), Gas ionization.

A study was made of electron density and total electron content in tubes of force near the knee in magnetospheric ionization. It was based on whistler observations made at Eights, Antarctica, in July and August 1963, under conditions of steady, moderate geomagnetic agitation (Kp = 2-4). During the period 0100-0400 LT, the electron density near the equatorial plane at a geocentric distance of 4 R sub E drops a factor of 30-100 within a distance of less than 0.15 R sub E. The corresponding change in tube content above 1 sq cm at 1000 km is a factor of about 10 within less than a degree of latitude. The afternoon profiles are generally similar to the postmidnight results. In the afternoon the profiles are often well defined outside the knee, falling smoothly to about 1 el/cmcc at 7 R sub E. Both the equatorial and tube content profiles show a definite repeatability between observations at a given local time and under conditions of moderate, steady geomagnetic agitation. Diurnal effects are evident, with amplitude differing from point to point on the profiles. The problem of the field-line distribution of ionization has been studied with a view to minimizing error in the profiles. Experimental and theoretical support has been found for using a diffusive-equilibrium distribution along the field lines inside the knee and a 'collisionless' model, along the field lines outside the knee. A study of error shows that the uncertainty in individual points on the knee profiles is everywhere less than a factor of plus or minus 2, and on the content profiles less than a factor of plus or minus 1.5. (Author)

AD-641 226 **Field 4A**
CFSTI Prices: HC$5.00 MF$1.00
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
AN ANALYSIS OF SONIC ANEMOMETER MEASUREMENTS FROM THE CEDAR HILL TOWER.
Environmental research papers,
by J. Chandran Kaimal. Aug 66, 163p AFCRL-ERP-215, AFCRL-66-542
Proj. AF-7655
Task 765502

Descriptors: (*Anemometers, *Atmospheric motion), Measurement, Velocity, Tables, Texas, Acoustic equipment.

In a field program conducted during the summer of 1963, sonic anemometers were operated at four levels on a 1400-ft tower to obtain measurements of the vertical velocity fluctuations under different stability conditions. This report provides a detailed description of the instrumentation, data reduction and analysis technique, and a complete listing of the processed spectral data. The results for four runs representing different but typical conditions are analyzed and interpreted. The main conclusion drawn from this study is that simplified concepts used for describing the vertical structure of turbulence near the ground do not apply to heights above 150 ft. (Author)

N66-30333 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EXPERIMENT ON PENDULUM MOTION OF A BALLOON GONDOLA.
by G. R. Riegler. Mar 66, 12p NASA-TM-X-55510, X-611-66-111

Descriptors: *Balloon flight, *Gondola, *Pendulum, *Rotation, Balloon, Flight, Horizon, Infrared, Monitor, Motion, Photography, Sensing.

For abstract, see STAR 04 17.

N66-30345 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BEHAVIOR OF TOPSIDE AND BOTTOMSIDE SPREAD F AT EQUATORIAL LATITUDES.
by B. V. Krishnamurthy. Apr 66, 25p NASA-TM-X-55522, X-615-66-159
Submitted For Publication

Descriptors: *Alouette i satellite, *Diurnal variation, *Geomagnetic effect, *Spread-f, *Topside program, Decay, Diurnal, Effect, Equator, Geomagnetic, Geophysics, Ionogram, Ionosphere, Latitude, Program, Topside, Variation.

For abstract, see STAR 04 17.

N66-30587 **Field 4A**
CFSTI Prices HC$3.00 MF$0.50
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
NEGATIVE ION DETECTION IN THE IONOSPHERE FROM EFFECTS ON ELF WAVES RESEARCH REPORT, JUL. 1965 - MAR. 1966.
by S. D. Shawhan. Mar 66, 57p NASA-CR-76216
Contracts NONR-93803, NONR-1509/06/
Its Rept.-66-11

Descriptors: *Ion density, *Ionospheric propagation, *Refractive index, *Very low frequency, Concentration, Density, Effect, Electromagnetic, Field, Frequency, Group, Index, Ion, Ionospheric, Magnetic, Negative, Phase, Plasma, Propagation, Refraction, Static, Very low, Wave, Whistler.

For abstract, see STAR 04 17.

N66-30605 **Field 4A**
CFSTI Prices HC$4.00 MF$1.00
Pennsylvania State Univ., University Park. Coll. Of Engineering.
F REGION ANALYSIS FROM RADIO PHASE DISPERSION MEASUREMENTS BETWEEN SEPARATING ROCKET CAPSULES SCIENTIFIC REPORT NO. 267.
by J. C. Widmaier. 20 Mar 66, 124p NASA-CR-76206
Grant NSG-134-61

Descriptors: *Electron density, *F layer, *Phase change, *Radio signal propagation, Absolute, Analysis, Capsule, Change, Data,

Density, Dispersion, Electron, Error, Harmonic, Ionosphere, Measurement, Phase, Profile, Propagation, Radio, Reduction, Rocket, Separation, Signal, Upper.

For abstract, see STAR 04 17.

N66-30612 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Geophysics Corp. Of America, Bedford, Mass. Technology Div.
PROCEEDINGS OF THE INTERDISCIPLINARY WORKSHOP ON VERTICAL RADIOMETRIC PROBING.
by E. T. Florance. Jun 65, 23p NASA-CR-76217, GCA-TR-65-12-N
Contract NAS5-3352
Meeting Held 23-24 Apr. 1965 Its Sci. Rept.-3

Descriptors: *Atmospheric temperature, *Microwave radiometer, *Rayleigh scattering, *Satellite observation, Atmospheric, Electromagnetic, Function, Infrared, Inversion, Linear, Microwave, Mie scattering function, Nonlinear, Observation, Passive, Radiometer, Satellite, Scattering, Sensing, Spectrum, Structure, Temperature, Thermal, Ultraviolet, Visible.

For abstract, see STAR 04 17.

N66-30846 Field 4A
CFSTI Prices HC$2.00 MF$0.50
California Univ., La Jolla. New Hampshire Univ., Durham.
DISTORTION OF THE MAGNETOSPHERE DURING A MAGNETIC STORM ON 30 SEPTEMBER, 1961.
by D. H. Bailey, and L. J. Cahill Jr. Jun 66, 37p NASA-CR-76362, UCSD-SP-66-3
Contract NASW-155, Grant NSG-624

Descriptors: *Distortion, *Explorer xii satellite, *Magnetic storm, *Magnetosphere, Field, Geomagnetic, Magnetic, Magnetometer, Measurement, Observation, Satellite, Storm.

For abstract, see STAR 04 17.

N66-31202 Field 4A, 3B
CFSTI Prices HC$1.00 MF$0.50
Kodaikanal Observatory (India).
ACTIVE PROMINENCES AND ASSOCIATED TERRESTRIAL EFFECTS.
by J. V. Narayana. 1965, 11p
Its Bull. No. 165

Descriptors: *International geophysical year (igy), *Prominence, *Solar activity effect, *Solar flare, *Terrestrial radiation, Activity, Effect, Flare, High velocity, Igy, Noise, Radiation, Radio, Solar, Terrestrial.

For abstract, see STAR 04 17.

N66-31383 Field 4A
CFSTI Prices HC$3.00 MF$0.50
Michigan Univ., Ann Arbor. Space Physics Research Lab.
AN ACOUSTIC WIND MEASURING TECHNIQUE SCIENTIFIC REPORT NO. 1.
by W. W. Bushman, G. R. Carignan, and G. M. Kakli. Jul 65, 56p NASA-CR-76411
Contract NAS8-11054

Descriptors: *Data reduction, *Noise measurement, *Saturn i (sa- 9) launch vehicle, *Wind measurement, Acoustics, Analysis, Computer, Data, Error, Exhaust, Gas, Measurement, Noise, Profile, Reduction, Sound, Wind.

For abstract, see STAR 04 17.

N66-31887 Field 4A
CFSTI Prices HC$3.00 MF$0.75
Geophysics Corp. Of America, Bedford, Mass. Technology Div.
MEASUREMENT OF UPPER ATMOSPHERIC IONIZATION AND WINDS WITH A COMBINED PAYLOAD INTERIM REPORT.
by J. F. Bedinger, G. T. Best, and L. G. Smith. Jun 66, 104p NASA-CR-76462, GCA-TR-66-11-N
Contract NASW-1083

Descriptors: *E layer, *Electron density profile, *Rocket flight, *Sounding rocket, Alkali, Aluminum, Atmosphere, Canister, Density, Electron, Flight, Ionosphere, Langmuir probe, Measurement, Methyl, Probe, Profile, Rocket, Sounding, Structure, Temperature, Trail, Upper, Vapor, Wind, Wind profile.

For abstract, see STAR 04 17.

N66-31931 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Geophysics Corp. Of America, Bedford, Mass. Technology Div.
SODIUM VAPOR EXPERIMENT QUARTERLY . 1 APR. - 30 JUN. 1966.
Jul 66, 21p NASA-CR-76500
Contract NAS5-3970

Descriptors: *Atmospheric turbulence, *Sodium vapor, *Sounding rocket, *Upper atmosphere, *Wind variation, Atmosphere, Atmospheric, Geophysics, Growth, Motion, Pattern, Photograph, Rocket, Sodium, Sounding, Trail, Turbulence, Upper, Vapor, Variation, Wind.

For abstract, see STAR 04 17.

N66-32285 Field 4A
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TEMPERATURE, PRESSURE, DENSITY, AND WIND MEASUREMENTS IN THE UPPER STRATOSPHERE AND MESOSPHERE, 1964.
by L. Katchen, W. Smith, P. Swartz, and J. Theon. Aug 66, 85p NASA-TR-R-245

Descriptors: *Density measurement, *Mesosphere, *Nike-cajun rocket, *Pressure measurement, *Stratosphere, *Table, *Temperature measurement, *Wind measurement, Analysis, Computer, Density, Error, Grenade, Measurement, Meteorology, Pitot, Pressure, Rocket, Sounding, Temperature, Tube, Upper, Wind.

For abstract, see STAR 04 17.

N66-32336 Field 4A
CFSTI Prices HC$2.50 MF$0.75
Aerochem Research Labs., Inc., Princeton, N. J.
STUDIES SUPPORTING AN UPPER-ATMOSPHERE CHEMICAL RELEASE PROGRAM. PART I - EXPERIMENTAL STUDIES ON CHEMILUMINESCENCE. PART II - A MODEL OF RELEASES LEADING TO UPPER-ATMOSPHERIC CHEMI-ION FORMATION FINAL REPORT, MAY 1965 - MAY 1966.
by G. D. Bleich, A. Fontijn, H. S. Pergament, and P. H. Vree. Jun 66, 62p NASA-CR-66123, TP-137
Contract NAS1-5035

Descriptors: *Atmosphere model, *Chemiluminescence, *Ionization, *Upper atmosphere, Acetylene, Aluminum, Atmosphere, Chemical, Density, Diborane, Electron, Model, Oxygen, Reaction, Release, Trimethyl, Upper.

For abstract, see STAR 04 17.

N66-32528 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Kyoto Univ. (Japan). Kwasan Observatory.
THERMAL STABILITY OF THE CHROMOSPHERE AND SPICULE.
by S. Miyamoto. 1965, 14p
Its Contrib. No. 139

Descriptors: *Chromosphere, *Spicule, *Thermal instability, Conversion, Corona, Emission, Energy, Flux, Instability, Japan, Mechanical, Radiance, Stability, Thermal.

For abstract, see STAR 04 17.

N66-36502 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Weapons Research Establishment, Salisbury (Australia).
IONOSPHERIC DATA FOR DECEMBER 1965 FROM SALISBURY, SOUTH AUSTRALIA.
May 66, 25p WRE-CPD-1965/12/5/

Descriptors: *Ionosphere, *Table, Atmosphere, Australia, Data, Ionosonde, Meteorology, Upper.

For abstract, see STAR 04 22.

N66-37219 Field 4A
CFSTI Prices HC$5.00 MF$1.25
New Hampshire Univ., Durham. Dept. Of Physics.
MEASUREMENTS OF IONOSPHERIC CURRENTS.
by N. C. Maynard. Apr 66, 177p NASA-CR-78234, UNH-66-2
Grant NSG-33

Descriptors: *Electron density, *Equatorial electrojet, *Geomagnetic field, *Ionospheric current, Current, Density, Electrojet, Electron, Equator, Field, Geomagnetic, Ionospheric, Langmuir probe, Lunar, Magnetometer, Measurement, Nike-apache rocket, Proton, Rocket, Sounding.

For abstract, see STAR 04 22.

N66-37306 Field 4A
CFSTI Prices HC$2.00 MF$0.50
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
ON THE LOCAL-TIME DEPENDENCE OF OUTER RADIATION ZONE ELECTRON (E GREATER THAN 1.6 ME V) INTENSITIES NEAR THE MAGNETIC EQUATOR.
by L. A. Frank. May 65, 34p NASA-CR-78233
Grant NSG-233, Contract NONR-1509/06/
Its Rept.-65-14

Descriptors: *Electron intensity, *Magnetic equator, *Outer radiation belt, *Time dependency, Apogee, Contour, Diurnal, Explorer xiv satellite, Local, Position, Solar, Telemetry, Variation, Wind, Zone.

For abstract, see STAR 04 22.

N66-37362 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Iit Research Inst., Chicago, Ill. Astro Sciences Center.
SYNOPTIC DESCRIPTION OF THE 5577 ANGSTROM NIGHTGLOW NEAR 78 DEG WEST LONGITUDE.
by J. A. Greenspan, and J. H. Woodman. 1966, 24p NASA-CR-78175
Contract NASR-65/11/

Descriptors: *Airglow, *Diurnal variation, *Intensity, Brightness, Diurnal, Emission, Excitation, Geomagnetic, Latitude, Measurement, Observation, Pattern, Photometer, Synoptic, Variation, Zenith.

For abstract, see STAR 04 22.

N66-37364 Field 4A
CFSTI Prices HC$2.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.

STRUCTURE OF THE SOLAR CORPUSCULAR STREAM AND ITS INTERACTION WITH THE EARTH'S MAGNETOSPHERE.
Struktura Solnechnogo Korpuskulyarnogo Potoka I Vzaimodeystviye Yego S Magnitosferoy Zemli
by YU. D.Kalinin, and E. I. Mogilevskiy. 27 Oct 65. 27p NASA-CR-78209, ST-PF-SP-GM-10405
Contract NAS5-3760
Transl. Into English From The Book "Issledovanie Kosmicheskii Prostranstva. Trudy Ysesoyuznoy Konferentsii Po Fizike Kosmicheskii Prostranstva" Moscow, "nauka" Publishing House, Sep. 1965 P 368-381

Descriptors: *Earth, *Magnetosphere, *Solar stream, Artificial, Corpuscular, Field, Geomagnetic, Interaction, Magnetic, Observation, Perturbation, Plasma, Satellite, Structure, Transfer, Variation.

For abstract, see STAR 04 22.

N66-37377 **Field 4A**
CFSTI Prices HC$2.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
GEOMAGNETIC PERTURBATIONS AND UPPER-ATMOSPHERE HEATING.
by L. G. Jacchia, J. Slowey, and F. Verniani. 22 Aug 66, 36p NASA-CR-78225, SAO SPECIAL REPT.-218
Grant NSG-87-60

Descriptors: *Atmospheric density, *Atmospheric temperature, *Geomagnetic effect, *Satellite drag, *Upper atmosphere, Delay, Geomagnetic, Heating, High, Inclination, Orbital, Perturbation, Storm, Time, Variation.

For abstract, see STAR 04 22.

N66-37474 **Field 4A**
CFSTI Prices HC$2.00 MF$0.50
European Space Research Organization, Paris (France).
COSMIC RADIATION.
by P. Marsden. May 66, 27p ESRO-SM-55
Lecture Given At Esro Summer School, Alpbach, Austria, 20 Jul. - 12 Aug. 1965

Descriptors: *Cosmic radiation, *Energy spectrum, *Particle motion, *Radiation detector, Anisotropy, Composition, Cosmic, Detector, Electron, Energy, Flare, High energy, Intensity, Motion, Neutron, Particle, Radiation, Ray, Solar, Spectrum.

For abstract, see STAR 04 22.

N66-37481 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
Institut D Aeronomie Spatiale De Belgique, Brussels.
ATMOSPHERIC HYDROGEN.
by D. R. Bates, and M. Nicolet. 1965, 14p A-39-1965
Submitted For Publication

Descriptors: *Atmospheric composition, *Diatomic molecule, *Hydrogen, *Molecular gas, *Thermosphere, Atmosphere, Atom, Coefficient, Diatomic, Diffusion, Distribution, Hydroxyl, Methane, Molecule, Oxygen, Photodissociation, Stratosphere, Tropopause, Troposphere, Vapor, Vertical, Water.

For abstract, see STAR 04 22.

N66-37496 **Field 4A, 3B**
CFSTI Prices HC$1.00 MF$0.50
Institut D Aeronomie Spatiale De Belgique, Brussels.
PANORAMA OF THE TERRESTRIAL ATMOSPHERE.
Panorama De L'atmosphere De La Terre
by M. Nicolet. 1966, 25p A-43-1966
In French, English, Dutch And German Summaries Submitted For Publication

Descriptors: *Atmospheric temperature, *Ionospheric composition, *Solar activity, Charge, Collision, Electron, Energy, Helium, Hydrogen, Loss, Maxwell distribution, Momentum, Nitrogen, Oxygen, Particle, Scattering, Thermal, Transfer.

For abstract, see STAR 04 22.

N66-37511 **Field 4A**
CFSTI Prices HC$2.00 MF$0.50
Bologna Univ. (Italy). Inst. Of Physics.
LOW-ENERGY COSMIC-RAY PHOTONS IN ATMOSPHERE.
by D. Brini, V. Ciriegi, F. Fuligni, and E. Moretti. 1965, 26p

Descriptors: *Atmosphere, *Cosmic radiation, *Cosmic ray, *Photon, *Radiation detector, Atmospheric, Balloon, Bremsstrahlung, Component, Detector, Electromagnetic, Electron, Energy, Launching, Low energy, Neutron, Pressure, Radiation, Scattering, Slow, Soft, Spectrum, X-ray.

For abstract, see STAR 04 22.

N66-37517 **Field 4A**
CFSTI Prices HC$3.00 MF$0.50
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
THE ADIABATIC MOTION OF OUTER ZONE PARTICLES IN A MODEL OF THE GEOELECTRIC AND GEOMAGNETIC FIELDS.
by H. E. Taylor. Jun 66, 52p NASA-CR-78394
Grant NSG-233-62
Its Rept.-66-24

Descriptors: *Charged particle, *Earth, *Magnetosphere, *Mathematical model, Adiabat, Calculation, Electric, Field, Flux, High latitude, Liouville theorem, Magnetic, Motion, Outer, Particle, Zone.

For abstract, see STAR 04 22.

N66-37525 **Field 4A**
CFSTI Prices HC$2.00 MF$0.50
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
INFLUENCE OF THE EARTH'S ROTATION UPON THE INTERACTION OF THE SOLAR WIND WITH THE MAGNETOSPHERE.
by E. W. Hones Jr. Jul 65, 41p NASA-CR-78403
Grant NSG-233-62
Its Rept.-65-26

Descriptors: *Coupling, *Earth rotation, *Magnetosphere, *Solar wind, Behavior, Body, Configuration, Electric, Energy, Entry, Field, Flow, Fluid, Influence, Interaction, Model, Plasma, Rotating, Theory, Viscous.

For abstract, see STAR 04 22.

AD-640 596 **See Field 9F**

AD-640 603 **See Field 1E**

AD-640 645 **See Field 12A**

AD-640 862 **See Field 17B**

AD-640 976 **See Field 18D**

AD-640 978 **See Field 20N**

AD-640 991 **See Field 20N**

N66-37509 **See Field 8N**

4B. METEOROLOGY

AD-448 630 **Field 4B, 16B**
CFSTI Price: HC$3.60
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
NIKE-APACHE SPEEDBALL II (ROUND NR. 50 SN017) 14 MAY 1964.
Meteorological data rept.,
by Gordon L. Dunaway. Jul 64, 36p ERDA-162
Task DA-1G6-50212A127-02

Descriptors: (*Meteorological parameters, Data), (*Impact prediction, Meteorological parameters), (*Sounding rockets, Impact prediction), Wind, Atmospheric pressure, Atmospheric temperature, Exterior ballistics, Tables, Meteorological balloons.

Identifiers: Nike-apache.

Meteorological data collected for the launching of Nike-Apache Speedball II, Round Nr. 50, SN-17, are presented for the Physical Sciences Laboratory of New Mexico State University, The U. S. Naval Research Laboratory, and for future ballistic studies. The meteorological data and resulting ballistic data appear in appendixes. (Author)

AD-448 632 **Field 4B, 19D**
CFSTI Price: HC$5.60
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
NIKE-APPACHE SPEEDBALL II (ROUND NR. 48 SN-16) 22 APRIL 1964.
Meteorological data rept.,
by H. M. Richart. Jul 64, 57p ERDA-164
Task DA-1G6-50212A127-02

Descriptors: (*Meteorological parameters, Data), (*Impact prediction, Meteorological parameters), Sounding rockets, Tables, Wind, Upper atmosphere, Balloons, Temperature, Humidity, Ballistics, Meteorology.

Identifiers: Nike-apache.

Meteorological data collected for the launching of Nike-apache Speedball II, round nr. 48, sn-16, are presented for the physical sciences laboratory of New Mexico State University, the Naval Research Laboratory, and for future ballistic studies. The meteorological data and resulting ballastic data appear in appendixes a, b, c, and d. (Author)

AD-45 950 **Field 4B**
CFSTI Prices: HC$6.60
Army Cold Regions Research and Engineering Lab., Hanover, N. H.
SNOW COVER. ITS FORMATION AND PROPERTIES,
by G. D. Rikhter. Aug 54, 61p CRREL-Trans-6 TT-66-62367
Trans. of mono. of Snezhnii Pokrov, Ego Formirovanie i Svoistva, Moscow 1945.

Descriptors: (*Snow, Physical properties), USSR, Atmospheric precipitation, Density, Classification, Thermal conductivity, Electrical properties, Trafficability.

The chief purpose of the book is to acquaint the military engineers and officer corps of Red Army with the chief properties of snow cover, and thereby to facilitate the utilization of snow in military operations. (Author)

AD-451 123 **Field 4B**
CFSTI Price: HC$3.00
Travelers Research Center, Inc., Hartford, Conn.
A STATISTICAL APPROACH TO 2-7 hr PREDICTION OF CEILING AND VISIBILITY, VOLUME I.
Technical rept.,
by Isadore Enger, John A. Russo, Jr., and Edna L. Sorenson. Sep 64, 56p TR-2, 7411-118
Contract Cwb-10704

Descriptors: (*Ceiling, *Weather forecasting), (*Visibility, Weather forecasting), Probability, Time, Meteorological parameters,

Frequency, Illinois, California, Washington (State), Statistical analysis, Weather stations, Test methods, Data.

Identifiers: Reep (Regression estimation of event probabilities), MDA (Multiple discriminant analysis), CEP (Climatological expectancy of persistence).

The statistical forecast technique regression estimation of event probabilities (REEP) is applied to predicting ceiling and visibility at Chicago and three west coast terminals for periods of 2, 3, 5 and 7 hours. The REEP forecast systems developed for each of the 36 predictands are applicable at any hour of the day and any day of the year. The systems were applied to an independent sample of 1460 cases for each predictand. The resulting forecasts were compared to forecasts prepared by the subjective forecaster under routine operational conditions, and to forecasts made by two control techniques, persistence and climatological expectancy of persistence (CEP). The forecasts made by the four techniques are expressed in categorical and/or probabilistic form. The categorical forecasts are evaluated by a score devised by the U. S. Weather Bureau and designed to measure skill in forecasting operationally important categories of ceiling and visibility. (Author)

AD-640 573 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Momouth, N. J.
BOUNDARY-LAYER METEOROLOGY AS DERIVED FROM REDUCTION OF THE FRIGORIMETER DATA PART I, TEMPERATE ZONE.
Technical rept.,
by E. C. Taylor-Ellis. Jul 66, 40p ECOM-2729
Proj. DA-1V0-14501-B-53A
Task 1V0-14501-B-53A-05

Descriptors: (*Meteorological instruments, *Meteorological parameters), Climatology, Analysis, Boundary layer, Meteorology, Wind, Atmospheric temperature.

Identifiers: Frigorimeters.

The automatic meteorological instrument, the Frigorimeter, and analyses of data from its use in temperate zones are presented for climatological values and Army usefulness. Reduction of data and presentation of results are descriptive of boundary-meteorology in a temperate environment. Historical and theoretical review of the terms and units of measurements for the Frigorimeter together with the results of the data reduction has led to three recommendations: (1) Use of the term 'wind chill,' also include 'T-W-P-R factor' (temperature, wind, precipitation, and radiation) as an inclusive and descriptive term. (2) Use of the electrical term 'kilowatts per meter squared per hour' as the actual variable in the sensor instrumentation rather than the bioclimatological limited term 'kilocalorie.' (3) Use of the term 'Frigorimeter (Climatograph)' as a more inclusive descriptive word for the sensor rather than only the 'coldness' term. Sixty-four months of data from the Belmar, N. J. and Natick, Mass. areas have been reduced and analyzed. These data recommend the instrument as an effective and efficient sensor for acquiring boundary-layer composite values of 'wind chill' (T-W-P-R factor) environment for climatological and Army use. (Author)

AD-640 578 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
A PROPOSAL FOR A SECONDARY STANDARD ILLUMINATION METER.
Technical rept.,
by R. M. Marchgraber, and R. W. Armstrong.
Aug 66, 22p ECOM-2750
Proj. DA-1V0-14501-B-53A
Task 1V0-14501-B-53A-02

Descriptors: (*Illumination, Meters), Meteorological instruments, Solar radiation, Radiometers, Optical filters.

The design criteria for a filter combination that allows the conversion of a previously developed high precision caloric radiometer into a secondary illumination instrument are stated, and a technique for computing suitable filter combinations and their errors is discussed. It is shown that a combination of two Schott filters (GG 10 and KG3) yields a technologically feasible solution which deviates only about one percent from the response of the normal human eye for air masses 1 through 5. (Author)

AD-640 628 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.
WIND TUNNEL MEASUREMENTS OF THE WIND DISTURBANCE FIELD OF A MODEL OF THE BUZZARDS BAY ENTRANCE LIGHT TOWER,
by E. L. Mollo-Christenson, and J. R. Seeholtz.
Sep 66, 19p
Contract N140 (122)77626B

Descriptors: (*Lighthouses, *Wind), Bays, Wind tunnels, Models (Simulations), Massachusetts, Turbulence, Interference, Seas.

Wind tunnel model tests were carried out to measure the wind interference created by the Buzzards Bay Entrance Light Tower in the atmospheric boundary layer. Tunnel measurements of wind profile were carried out at certain positions in the vicinity of the tower for several wind directions. The results indicate that at a distance of 50 feet from the tower the wind velocity profile may change about six percent, and larger changes are observed in certain special cases. (Author)

AD-640 904 **Field 4B**
Not available from CFSTI.
Suffield Experimental Station, Ralston (Alberta).
CROSS-ARC DEPOSIT OF PARTICLES FROM CONTINUOUS AND INSTANTANEOUS SOURCES.
Technical note,
by E. R. Walker. 3 Sep 65, 4p Suffield-TN-150
Proj. DRB-D52-95-10-28
Revision of manuscript submitted 12 Jul 65.
Availability: Published in Quarterly Journal of the Royal Meteorological Society v92 n393 p411-4 Jul 1966.

Descriptors: (*Atmospheric motion, Tracer studies), (*Meteorological parameters, Diffusion), Particles, Spheres, Statistical distributions, Wind, Canada.

Experimental details are presented for two series of short-range diffusion experiments in which glass spheres were emitted from continuous and instantaneous sources. Observed standard deviations of cross-arc deposits were compared with predictions. For instantaneous sources these standard deviations were fairly well forecast by the simple method of Smith and Hay, although predictions were improved by use of the most appropriate value of Beta, a Lagrangian-Eulerian scale factor. Continuous source cross-arc standard deviations were well forecast by Hay and Pasquill's method. (Author)

AD-641 044 **Field 4B**
Not available from CFSTI.
Cornell Univ., Ithaca, N. Y.
SEARCH FOR DISCRETE SOURCES OF COSMIC GAMMA RAYS ABOVE 1 GeV,
by H. B. Ogelman, J. P. Delvaille, and K. I. Greisen. 16 Feb 66, 4p
Grant AF-AFOSR-255-65
Proj. AF-9751
Task 975104
AFOSR-66-1283
Availability: Published in Physical Review Letters v16 n11 p491-4 Mar 14 1966.

Descriptors: (*Cosmic rays, *Gamma rays), Cosmic ray telescopes, Balloons, Galaxies, Scanning.

Discusses the attempts made to detect sources of cosmic gamma rays above 1 GeV with a balloon-borne instrument. A schematic cross section of the apparatus is shown consisting of a pair of sonic spark chambers which recorded the direction of the pair formed after conversion of the photon in one radiation length of lead above the upper chamber.

N66-30185 **Field 4B**
CFSTI Prices HC$7.00 MF$1.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TERRESTRIAL ENVIRONMENT (CLIMATIC) CRITERIA GUIDELINES FOR USE IN SPACE VEHICLE DEVELOPMENT, 1966 REVISION.
by G. E. Daniels, J. R. Scoggins, and O. E. Smith.
1 May 66, 342p NASA-TM-X-53328

Descriptors: *Climate, *Earth atmosphere, *Environment, *Spacecraft design, Abrasion, Atmosphere, Atmospheric, Bacteria, Corrosion, Data, Design, Development, Earth, Electricity, Geography, Humidity, Precipitation, Pressure, Spacecraft, Temperature, Thermal, Wind.

For abstract, see STAR 04 17.

N66-30205 **Field 4B**
CFSTI Prices HC$2.00 MF$0.50
White Sands Missile Range, N. Mex. Atmospheric Sciences Lab.
AEROBEE NASA 4.165 AU (21 APRIL 1966) METEOROLOGICAL DATA REPORT.
by M. M. Hoidale. May 66, 35p NASA-CR-76054, DR-12
Prepared For Nasa

Descriptors: *Aerobee rocket, *Ballistic trajectory, *Meteorology, Atmosphere, Ballistics, Balloon, Component, Humidity, Impact, New mexico, Trajectory, Upper, Velocity, Wind.

For abstract, see STAR 04 17.

N66-31892 **Field 4B**
CFSTI Prices HC$3.25 MF$1.25
Kaman Aircraft Corp., Colorado Springs, Colo. Nuclear Div.
VARIABILITY OF SOUND PROPAGATION PREDICTION DUE TO ATMOSPHERIC VARIABILITY FINAL REPORT.
by C. E. Buell. 10 Jun 66, 196p NASA-CR-76464, KN-66-698-1/F/
Contract NAS8-11348

Descriptors: *Meteorology, *Noise propagation, *Sound intensity, Atmosphere, Attenuation, Component, Distance, Estimate, Geometry, Humidity, Long, Monte carlo method, Noise, Parameter, Pattern, Prediction, Pressure, Propagation, Ray, Short, Sound, Source, Temperature, Tracing, Vapor, Variable, Virtual, Wind.

For abstract, see STAR 04 17.

N66-31905 **Field 4B**
CFSTI Prices HC$3.00 MF$0.75
Travelers Research Center, Inc., Hartford, Conn.
THE PREDICTABILITY OF WIND AND VIRTUAL TEMPERATURE PROFILES FOR FLIGHT AND STATIC TEST OPERATIONS FINAL REPORT, JUL. 1, 1965 - MAR. 31, 1966.
by J. T. Ball, J. P. Gerrity Jr, D. B. Spiegler, and K. W. Veigas. Mar 66, 109p NASA-CR-76536
Contract NAS8-20234
Its Rept.-7473-209

Descriptors: *Flight test, *Static testing, *Temperature profile, *Wind profile, Firing,

Flight, Jet, Meteorology, Missile, Operation, Prediction, Profile, Propagation, Sound, Static, Stream, Temperature, Test, Testing, Virtual, Wind.

For abstract, see STAR 04 17.

N66-32333 Field 4B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FOCAL POINT COMPUTATION IN A THREE-LAYERED ATMOSPHERE.
by J E. Mabry. 24 Jun 66, 40p NASA-TM-X-53479

Descriptors: *Atmospherics, *Computer program, *Focus, *Sound propagation, Atmosphere, Calculation, Computer, Location, Multilayer, Point, Program, Propagation, Sound, Velocity.

For abstract, see STAR 04 17.

N66-32553 Field 4B
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Dept. Of The Geophysical Sciences.
ANGULAR DEPENDENCE OF ALBEDO FROM STRATIFORM CLOUDS AS MEASURED BY TIROS IV SCANNING RADIOMETERS.
by A. Rabbe. Jun 66, 27p NASA-CR-76799, SMRP-58
Grant NSG-333

Descriptors: *Albedo, *Anisotropy, *Cloud cover, *Tiros iv satellite, Angle, Backscatter, Cloud, Cover, Emission, Low, Meteorology, Radiation, Radiometer, Satellite, Scanning, Specular, Stratiform, Wall.

For abstract, see STAR 04 17.

PB-173 315 Field 4B
CFSTI Prices: HC$4.60 MF$0.50
Meteorology Research, Inc., Pasadena, Calif.
CLOUD ELECTRIFICATION STUDY.
Final rept.,
by P. B. MacCready Jr, K. M. Beesmer, and T. J. Lockhart. 15 Jul 59, 41p
Contract AT (04-3)-236

Descriptors: (*Atmospheric electricity, Theory), (*Clouds, Electrostatics), Ice, Hail, Artificial precipitation, Lightening, Space charges, Atmospheric sounding, Nucleation.

One of a large variety of cloud electrification theories attributes a dominant charging mechanism in typical clouds over the U. S. to ice hydrometeors falling through supercooled clouds. The report describes a small field study initiated to investigate this electrification theory using 'simple' clouds which could be expected to yield definite results because of their uncomplicated structure. At Flagstaff, Arizona, the electrification around small supercooled fair weather cumulus clouds was measured and found to be negligible. Ice hydrometeors were created in selected ones of these clouds by conventional dry ice seeding. In support of the theory, strong electrification resulted, and on at least one occasion intracloud discharges occurred within a small seeded cloud. The strength of the electrification effects was roughly proportional to the amount of ice hydrometeors which descended from the cloud. These results imply that some effect associated with an ice hydrometeor mechanism is strong enough to play a dominant role in the electrification of typical thunderstorms. Sequence photographs of the cloud seeding are presented, together with discussions of the hydrometeor growth. (Author)

PB-173 422 Field 4B
CFSTI Prices: HC$2.00 MF$0.50
Texas A. and M. Research Foundation, College Station.
THE USE OF SATELLITE CLOUD PICTURES TO ESTIMATE AVERAGE RELATIVE HUMIDITY BELOW 500 MB.
Final rept.,
by Aylmer H. Thompson, and Philip W. West. 31 May 66, 32p Ref-66-11F
Contract Cwb-11247
Proj. A/M-440

Descriptors: (*Meteorological satellites, Photographs), (*Cloud cover, Humidity), (*Weather forecasting, *Humidity), Moisture, Clouds, Statistical analysis, Mexico Gulf, Radiosondes, Periodic variations.

Current quantitative procedures for forecasting clouds and precipitation in the eastern United States require a determination of the distribution of the average relative humidity below 500 mb. This quantity is readily available over the land masses but not over the adjacent water areas, though these areas are primary sources of moisture for the region of forecast concern. However, since the existence of clouds implies the existence of a saturated atmosphere, there should be some relationship between the type and amount of cloudiness and the average relative humidity of the desired column of air. This study describes an attempt to obtain a statistical relationship between the clouds (as pictured by meteorological satellites) and the average relative humidity. The area studied is over and near the Gulf of Mexico. Satellite TV cloud observations were classified according to a system developed for the purpose. Classification numbers for small areas in the vicinity of the radiosonde stations were correlated with the observed average relative humidity. (Author)

PB-173 424 Field 4B
CFSTI Prices: HC$4.00 MF$0.75
GCA Technology Div., GCA Corp., Bedford, Mass.
CASE STUDIES OF EXTRATROPICAL CYCLONES WITH SATELLITE-VIEWED CLOUD PATTERNS.
Final rept.,
by Edward M. Brooks, and William E. Shenk. Jun 66, 99p GCA-TR-66-8-G
Contract Cwb-11128
Prepared in cooperation with Environmental Sciences Services Administration, Washington, D. C.

Descriptors: (*Meteorological satellites, Photographs), (*Tropical cyclones, *Clouds), Cloud cover, Meteorological parameters, Meteorological charts, Jet streams (Meteorology), Troposphere.

Identifiers: TIROS.

TIROS pictures of the cloud patterns of occluding extratropical cyclones were compared in detail with conventional meteorological data plotted and analyzed in charts and cross sections to obtain more meaningful interpretations of satellite cloud pictures. Ten case studies were performed for data-rich areas: three in North America and seven in Europe. The results showed that the vortex cloud structure in each picture gave a good representation of the cyclonic circulations in the upper troposphere east of the center and the lower troposphere west of the center. Patterns of large cloud units with clear-cut sharp edges indicated a young deepening baroclinic system with considerable tilt of the axis of low pressure; whereas small diffuse cloud units with irregular edges indicated an old, filling, and nearly barotropic system with a more nearly vertical axis. The jet stream curved cyclonically around young cyclones, but remained south of old cyclones and did not participate in their rotation. Sprial-shaped cloud bands and dry tongues behind them curved counterclockwise inward and tapered toward the center. The major cloud band was usually a good locator of the cold front or the cold-front type of occluded front. A pre-major band southeast of the center indicated a squall line; one northwest, a slow moving cold front north of the center. Post-major bands indicated developing troughs with secondary cold fronts. The cloud band associated with a warm front or a warm-front type of occluded front was generally wide and centered a considerable distance north of the surface front. (Author)

PB-173 425 Field 4B
CFSTI Prices: HC$3.00 MF$0.75
Michigan Univ., Ann Arbor. Dept. of Meteorology and Oceanography.
AN ATTEMPT TO USE SATELLITE PHOTOGRAPHY IN NUMERICAL WEATHER PREDICTION.
Technical rept.,
by James H. S. Bradley, and Christopher M. Hayden. Jun 66, 85p Rept. no. 07424-1-T
Contract Cwb-11145

Descriptors: (*Weather forecasting, Meteorological satellites), (*Meteorological satellites, Photographs), Numerical analysis, Wind, Errors, Meteorological charts, Radiosondes, Jet streams (Meteorology), Harmonic analysis, Thermal radiation.

Identifiers: SINAP, TIROS.

TIROS photographs were used for barotropic reanalysis in the Pacific, changes in the stream function or its Laplacian being advected into areas with verification data by the NMC barotropic model, following McClain, Ruzecki and Brodrick. No significant forecast improvement was obtained in cases of unusually bad forecasts, despite experiments in varying the intensity of the reanalyzed systems. No continuity and no radiation data were available: the estimation of winds and vorticities is difficult. Hindcast-reforecast procedures indicated that the main causes of error in unusually bad forecasts are not susceptible to satellite correction, and that difficulties in the balance equation had caused the stream field to contain many negative absolute vorticities not present in the geopotential analysis. The methods used would be more promising in cases with smaller forecast errors. (Author)

PB-173 428 Field 4B
CFSTI Prices: HC$2.00 MF$0.50
Allied Research Associates, Inc., Concord, Mass.
CIRRUS CANOPIES IN TROPICAL STORMS.
Final rept.,
by Raymond Wexler, Earl S. Merritt, and Dave Chang. Aug 66, 37p ARA-8G31-F
Contract Cwb-11305

Descriptors: (*Air traffic control systems, *Television display systems), Design, Computer logic, Circuits, Radar beacons, Test methods.

Identifiers: Alpha-numeric symbols, ANG, ARTS, SPAN.

Hazeltine has developed and installed two Alpha Numeric Generator equipments in the FAA Atlanta and Indianapolis Air Traffic Control Centers. These equipments have passed all acceptance tests and are undergoing operation testing. These Alpha Numeric Generators electronically label aircraft radar blips on air traffic controller's displays with identity, altitude, vector, speed, and other data. The use of the Alpha Numeric Generators in the ARTS and SPAN air traffic control systems automates former manual functions of the controllers, reduces the necessary communications with aircraft pilots, and minimizes the possibilities of errors in air traffic control. A summary of development problems and test results on the Alpha Numeric Generators is given. (Author)

PB-173 430 Field 4B
CFSTI Prices: HC$1.00 MF$0.50
Meteorological Satellite Lab., Weather Bureau, Washington, D. C.
A SUMMARY OF EXPERIENCES IN COMPUTER PROCESSING OF NIMBUS I DATA,
by C. L. Brister. Jun 66, 23p Rept. no. 27

Descriptors: (*Meteorological satellites, Data processing systems), Photographs, Digital

computers, Radiometers, Vidicons, Programming (Computers).

Identifiers: Nimbus.

A substantial effort was expended toward the automated processing of satellite data. Problems involving the data processing hardware complex and the general quality of incoming signals as well as those involving the computer programs, all contrived to create a marginal operation during the brief lifetime of Nimbus I. Despite all problems, a considerable number of working programs were checked out and used to a limited degree. The experience gained during this operational test period has provided invaluable insight into problems, and has produced a considerable list of design constraints that are now being used as attributes and specifications in the current TIROS operational system effort. (Author)

PB-173 431 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Bohan (Walter A.) Co., Park Ridge, Ill.
SATELLITE PHOTOGRAPH CATALOG. CHARACTERISTICS OF SUMMER SEASON CLOUD PATTERNS OVER THE UNITED STATES TIROS VI AND TIROS VII.
Final rept.,
by Walter A. Bohan. Jun 66, 23p
Contract Cwb-10984
Availability: Original document in color until exhausted.

Descriptors: (*Meteorological satellites, Photographs), (*Cloud cover, Periodic variations), United States, Weather forecasting, Radar echo areas.

Identifiers: TIROS.

A comprehensive catalog of satellite viewed cloud cover related to summer season (June - July - August 1963) synoptic situations over the United States has been prepared and is presented in a series of five volumes. The data display format consists of a two page layout showing TIROS cloud cover photographs and related surface and upper air charts, radar charts, and nephanalyses. Color transparencies are used to enhance composite viewing of meteorological data and cloud cover patterns depicted by the nephanalyses. The catalogs represent a first historical series which provide radar echo coverage on a synoptic-scale for comparison with TIROS cloud cover photography. (Author)

PB-173 432 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.50
Atmospheric Research and Development Corp., Kansas City, Mo.
HEAVY SNOW FORECASTING IN THE CENTRAL UNITED STATES.
Final rept.,
by Howard H. Hanks Jr. Jul 66, 57p
Contract Cwb-11098

Descriptors: (*Weather forecasting, *Snow), United States, Rainfall, Atmospheric precipitation, Statistical analysis, Thunderstorms.

Snow storms occurring in the central United States during the period 1959 to 1965 and producing storm totals of 4 inches or more were studied in relation to parameters at or between 500 mb. and sea level. An investigation of various thickness increments was made to determine the most effective thickness line separating rain and freezing rain from snow. Statistics were used to estimate the distance of the maximum snow band from the 850 mb. low, and the width of the snow band was related to the magnitude of the sea level geostrophic vorticity. Timing of snow and the effect of thunderstorms on snowfall were also investigated. The results indicate that the 2840 meter 1000-700 mb. thickness line is the most useful rain-snow demarcation thickness over most of the central part of the country. The best estimate of maximum snow storm total is determined from a combination of sea level and 500 mb. vorticities; the best estimate of timing of the beginning of most snow is by 850 mb. advection of the 850 mb. or equivalent surface dew point; and thunderstorms contribute significantly to snowfall only when they occur generally north of the sea level low center. (Author)

PB-173 434 **Field 4B**
CFSTI Prices: HC$7.20
Florida State Univ., Tallahassee. Dept. of Meteorology.
SATELLITE STUDY, TROPICAL NORTH ATLANTIC, 1963. PART II. SATELLITE AND CONVENTIONAL DATA A DAILY COMPARISON, AUGUST 1-31,
by C. I. Aspliden, G. A. Dean, and H. Landers.
Jul 66, 159p Rept. no. 66-4
Grant WBG-58
See also PB-169 056. Availability: Reference only at CFSTI after original stock is exhausted.

Descriptors: (*Meteorological satellites, *Weather forecasting), (*Air mass analysis, Marine meteorology), (*Marine meteorology, Atlantic Ocean), Meteorological charts, Clouds, Photographs.

The report presents twenty-four hour continuity at sea-level and at 200 mb plus cloud charts and mosaic presentation of satellite pictures for a considerably larger area which includes the region depicted in Part I.

AD-641 139 **See Field 20D**

UCRL-14700 **See Field 18H**

5. BEHAVIORAL AND SOCIAL SCIENCES

N66-37488 **See Field 8F**

5A. ADMINISTRATION AND MANAGEMENT

AD-409 455 **Field 5A**
CFSTI Price: HC$7.60
Booz-Allen Applied Research, Inc., Chicago, Ill.
COOPERATING AGENCY METHOD FOR EVENT REPORTING AND ANALYSIS (CAMERA),
by M. P. deRegt. May 63, 70p Rept. no. 180-2-48
Contract NObsr-85241

Descriptors: (*Management engineering, Communication satellites (Active)), (*Space communication systems, Management engineering), (*Communication satellites, Management engineering), Navy, Data processing systems, Ships, Programming (Computers).

Certain large, national-level programs are characterized by participation on a nearly equal basis of several major services and agencies, tied together by a management group whose functions are of a coordinating rather than a directing nature. All aspects of such programs cannot always be determined initially, but may develop or evolve. The Cooperating Agency Method for Event Reporting and Analysis (CAMERA) was developed as a program control technique for the U. S. Navy Management Staff, Bureau of Ships, Communications Satellite Program. Its purpose is to monitor all phases of a program in an expeditious and inexpensive manner. Each participant in a program is required to report on the status of his tasks. For the CAMERA Report, all milestones are divided into various status categories: Completed, Cancelled, Rescheduled, New, Behind Schedule, Due Next Report Period, and Active. There are further break-downs within these categories to give a more detailed picture of each milestone--action taken, responsible agency, performing contractor, and appropriate dates. The report is then distributed to all participants, who are able to see the overall progress of the project. This is particularly valuable to each program manager in his decision-making activities. The applicability of CAMERA to a multi-participant project was successfully demonstrated when the Navy COMSAT Management Staff used it during the conversion of the USNS Kingsport, a satellite communication ship. It is in this type of complex national inter-agency, and inter-service project that CAMERA proves a valuable management aid, including its use as a PREPERT data gathering tool. This report describes the method in detail, including necessary information elements, the implementation of CAMERA, the report preparation procedure, and a description of a semi-automated procedure using an IBM 1401.

AD-447 118 **Field 5A**
CFSTI Price: HC$4.00
Stanford Research Inst., Menlo Park, Calif.
AN EXPLORATORY STUDY OF THE STRUCTURE AND DYNAMICS OF THE R/D INDUSTRY,
by Albert Shapero, Richard P. Howell, and James R. Tombaugh.Jun 64, 144p
Contract SD-158
Proj. IMU-4370
Report on R/D Studies Series.

Descriptors: (*Research program administration, Scientific research), Management engineering, Defense systems, Manpower studies, Bibliographies, Education, Materials, Inhibition, Distribution.

This is a report on the first phase of a study being conducted for the Office of the Director of Defense Research and Engineering (ODDRE) of the Department of Defense (DOD). This series includes studies of the structure, organization, and dynamics of the research and development industry in the United States and abroad; the management of research and development organizations; technology utilization and transfer; technical manpower; and systems analysis and other methodologies as a foundation for these investigations of R + D processes and organization. (Author)

AD-640 607 **Field 5A, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
TECHNICAL REPRINTS AND REPORTS RELEASED FOR UNRESTRICTED CIRCULATION, 1 JULY 1964-31 MARCH 1966.
Technical memo.
Aug 66, 49p TG-727-1
Contract NOw-62-0604

Descriptors: (*Physics laboratories, Reports), Physics, Guided missiles.

Part I of the report is a listing of reprints of technical articles prepared by members of the APL staff and made available between 1 July 1964 and 31 March 1966. Part II is a listing of unclassified technical reports which are released for unrestricted circulation, dated during the same time interval. An Author Index is included. (Author)

AD-640 651 **Field 5A, 5C, 12B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
A HEURISTIC INVESTMENT MODEL FOR NONPROFIT RESEARCH.
Professional paper,
by Nake M. Kamrany, and John E. Elliott. 29 Aug 66, 41p SP-2567
Contract AF 19 (628)-5166
Prepared for presentation at the Western Economic Association meeting at California Univ Berkeley, on August 25, 1966.

Descriptors: (*Scientific research, Selection), (*Economics, Scientific research), Decision making, Model theory, Scheduling.

The model provides a maximization approximation in a simple yet systematic and rational way for selecting research projects from many alternatives. Moreover, the methodology explicitly takes into account the qualitative and quantitative attributes of research projects. Specifically, the model readily provides pertinent information regarding projects that are of value to the decision-makers and project leaders, including the following: rate of return on investment; qualitative attributes per dollar of investment; initial costs of projects; continuing investment requirements; alternative levels of investment; time necessary to break-even; time necessary to complete the project; and any other overriding critical factors. Further work needs to be done in providing a systematic method for making future costs and benefits estimates and for developing consistency and credibility checks. Moreover, some rational yet simple and operational method is needed to assist in determining the relative shares of qualitative and quantitative budgets. (Author)

AD-641 170 **Field 5A, 14A, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Center for Naval Analyses, Washington, D. C. Systems Evaluation Group.
ON DISCOUNTING AND RISK IN MILITARY INVESTMENT DECISIONS,
by V. L. Broussalian. 18 Aug 66, 18p SEG Research Contrib-10
Contract Nonr-3732 (00)

Descriptors: (*Armed forces budgets, Economics), (*Economics, Armed forces operations), Decision making, Costs, Optimization, Cost effectiveness, Operations research, Management planning.

Identifiers: Investments.

The term, discounting, is often applied indiscriminately to two distince operations. One operation, which attempts to simulate the capital market's evaluation of an investment, represents a conceptual exchange between current and future income resulting in a 'present value.' The other refers to an essentially subjective revision, normally downward, of an expected future benefit or cost, for any of a number of reasons. It is pointed out that in the case of a military effectiveness stream (a typical example of a non-marketable benefit stream), it is meaningless to discount in the first sense. On the other hand, whereas discounting in the second sense could be meaningfully applied, there is no single rate which the analyst acting on behalf of the decision-maker can apply. The practice of raising the discount rate by a premium to take care of risk and uncertainty may be appropriate when discounting in the first sense, but is likely to lead to erroneous results when discounting in the second sense. (Author)

N66-30756 **Field 5A**
CFSTI Prices HC$5.00 MF$1.25
George Washington Univ., Washington, D. C.
MAJOR FACTORS IN AEROSPACE PLANNING AND DECISION-MAKING.
by R. G. Smith. 10 May 66, 184p NASA-CR-76298
Grant NSG-727

Descriptors: *Aerospace technology, *Decision making, *Management planning, Aerospace, Development, Industry, Long, Management, Planning, Range, System, Technology.

For abstract, see STAR 04 17.

N66-32410 **Field 5A**
CFSTI Prices HC$2.00 MF$0.50
Canterbury Univ., Christchurch (New Zealand). Dept. Of Chemical Engineering.
MASS-TRANSFER OPERATIONS IN NEW ZEALAND.
by R. B. Keey. 1965, 26p

Descriptors: *Manufacturing, *Mass transfer, *New zealand, Beverage, Chemical, Coal, Food, Mass, Mineral, Operation, Paper, Petroleum, Practice, Processing, Survey, Transfer, Trend.

For abstract, see STAR 04 17.

N66-37543 **Field 5A**
CFSTI Prices HC$1.00 MF$0.50
Washington Univ., St. Louis, Mo. Dept. Of Economics.
PROGRAM BUDGETING AND THE SPACE PROGRAM.
by M. L. Weidenbaum. Sep 66, 21p NASA-CR-78386
Grant NSG-342
Its Paper 6607

Descriptors: *Budget, *Economics, *Management planning, *Space program, Commercial, Effort, Government, Output, Resource, System.

For abstract, see STAR 04 22.

PB-173 456 **Field 5A**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Univ., Cambridge, Mass. Graduate School of Business Administration.
OBSERVATIONS ON CHOICE AND UNCERTAINTY IN DEVELOPMENT DECISIONS,
by Richard S. Rosenbloom. 1966, 14p
Presented at Institute of Management Sciences, Session on Research and Development Management, San Francisco, Calif., 1965. Rept. on NSF Scientific Documentation Project.

Descriptors: (*Decision making, Management engineering), Decision theory, Problem solving, Information retrieval.

The paper characterizes technical development as a process in which a hierarchy of iterative choices are made about the acquisition of information and the accomplishment of tangible milestones. A choice problem in a single project is described as an example of the application of a Bayesian method of analysis using the criterion of maximization of expected value. The problem of complexity, which frustrates actual use of extensive methods of evaluation, is identified and discussed. Simple heuristics for simplification of the problem are considered. The paper concludes that further research should be conducted in the small on well-defined choice problems, using general notions of decision-making under uncertainty to lend unity to such efforts. (Author)

AD-244 705 **See Field 15E**

AD-640 668 **See Field 12B**

AD-640 685 **See Field 12B**

AD-640 697 **See Field 12B**

AD-641 169 **See Field 9B**

AD-641 193 **See Field 12A**

AD-641 195 **See Field 12A**

N66-37501 **See Field 22A**

5B. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-453 025 **Field 5B, 4**
CFSTI Price: HC$6.60
Pennsylvania Univ., Philadelphia, Pa. Inst. for Cooperative Research.
PRELIMINARY ANALYSIS OF FUNCTIONAL REQUIREMENTS FOR CHEMICAL INFORMATION DATA SYSTEM,
by Clarence T. Van Meter, S. D. Bedrosian, and David Lefkovitz. Nov 64, 64p
Contract DA-18-035-AMC-288 (A)

Descriptors: (*Data processing systems, *Chemistry), (*Data storage systems, Chemistry), Information retrieval, Chemical compounds, Classification, Vocabulary, Automatic, Magnetic tape, Bibliographies, Chemicals.

AD-455 078 **Field 5B**
CFSTI Price: HC$12.60
Mayo-Wells (Wilfrid James), Washington, D. C.
ORGANIZATION OF A NATIONAL SCIENTIFIC AND TECHNICAL INFORMATION CENTER.
1965, 130p

Descriptors: (*Technical information centers, Operation), Information retrieval, Management planning, United States Government, Scientific research, Data processing systems, Industrial research, Documentation.

Contents: Dissemination of Scientific and Technical Information; Selection of the Optimum Plan to Achieve Objectives; Selection of the Criteria by which the Information Disseminated by NIAC should be Judged; The Functions and Operations of a Scientific and Technical Information Center.

AD-640 572 **Field 5B**
CFSTI Prices: HC$3.00 MF$0.75
System Development Corp., Santa Monica, Calif.
A BIBLIOGRAPHY ON INFORMATION SCIENCE AND TECHNOLOGY FOR 1966. PART II.
Technical memo.,
by Frances Neeland. 15 Sep 66, 89p TM-3008/002/00
See also AD-635 200.

Descriptors: (*Documentation, Bibliographies), Information retrieval, Subject indexing, Libraries.

The primary aim of the continuing bibliography is to assist the authors of the chapters in 'Annual Review of Information Science and Technology' in discovering the existence or determining the identity of documents relevant to their topics. The style of entries also reflects the authors' requirements. The 'Abbreviations and Index for Periodicals Cited' is cummulative for parts I and II. (Author)

AD-640 658 **Field 5B, 9B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
PROCESSING NATURAL LANGUAGE TEXT,
by David G. Hays. Oct 66, 8p P-3461
Prepared for presentation at Seminar on Computational Linguistics held by the National Institutes of Health, 6-7 October 1966.

Descriptors: (*Language, *Data processing systems), Documentation, Computers, Linguistics.

Documentation and content analysis are discussed as tools of psychological research.

AD-640 680 **Field 5B**
CFSTI Prices: HC$3.00 MF$0.75
Center for Naval Analyses, Washington, D. C. Marine Corps Operations Analysis Group.
MARINE CORPS OPERATIONS ANALYSIS GROUP INFORMATION RETRIEVAL SYSTEM,
by P. M. Tullier, and T. W. Mason. 15 Jun 66, 62p
MCOAG Research Contrib-6
Contract Nonr-3732 (00)

Descriptors: (*Information retrieval, *Operations research), Marine Corps, Subject indexing, Documentation, Data storage systems.

An information retrieval system was developed by the Marine Corps Operations Analysis Group (MCOAG) to furnish assistance to Headquarters Marine Corps (HQMC), the Marine Corps Landing Force Development Center (MCLFDC) and

the Marine Corps Long Range Study Panel (LRSP). In operation of the system, a large volume of classified information is scanned by MCOAG analysts and only those items pertinent to operations research on Marine Corps problems are filtered out. Each document is then tagged with descriptors which attempt to capture essential elements of the paper. The descriptors are drawn from groupings of things, places, operational function, organizations, physical phenomena, values, processes and environments. The title of each document, source, security classification, year of publication, descriptors, the Defense Documentation Center (DDC) accession number and the secret or confidential file accession number of HQMC, Marine Corps Schools, MCLFDC or CNA are put into computer storage. Monthly accession bulletins are to be produced for HQMC, MCLFDC, Marine Corps Long Range Study Panel and the MCOAG research staff. Individual requests for information from HQMC staff sections or MCLFDC project officers are to be processed to retrieve documents and to produce bibliographies on demand. (Author)

AD-640 811 **Field 5B**
CFSTI Prices: HC$4.00 MF$0.75
Air Force Flight Test Center, Edwards AFB, Calif.
A PROPOSED ORGANIZATION AND SYSTEM FOR HANDLING AND MANAGING AIR FORCE IN-HOUSE GENERATED TEST AND EVALUATION TECHNICAL DATA AND INFORMATION.
Technical rept.,
by Gene C. Lemmon. Sep 66, 104p FTC-TR-66-26

Descriptors: (*Documentation, Management control systems), Air Force, Information retrieval, Data storage systems, Handling, Management planning, Decision making, Communication systems, Man-machine systems, Input-output devices, Costs, Reproduction, Programing (Computers), Quality control.

The study was undertaken to develop an integrated and systemic approach to the management and handling of technical data and information generated during Air Force in-house test and evaluation projects and programs. The organization and system proposed uses a team made up of a technical editor, technical illustrator, and an editorial typist. Models show how this team can be integrated with the IBM Magnetic Tape Selectric Typewriter (MTST) system to more efficiently and economically handle and manage technical data and information through the use of a central-data-banking technique and the machine's ability to rapidly update and reproduce several different type fonts and textual formats either as clean draft copy or camera-ready copy. The critical path method is used to identify project or program uncertainties, potential slippages and their portable impact, routines requiring action and decisions, and areas of routines where tradeoffs may be made to aid in meeting schedule dates. The proposed system has the potential of saving 64 cents for every page keyboarded for inclusion in test plans, technical letters, progress reports, and final technical reports. (Author)

AD-641 092 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Federal Council for Science/Technology, Washington, D. C. Committee on Scientific/Technical Information.
STANDARD FOR DESCRIPTIVE CATALOGING OF GOVERNMENT SCIENTIFIC AND TECHNICAL REPORTS.
Revision no. 1.
Oct 66, 54p
Also released as PB-173 314 HC$1.00 MF$0.50.

Descriptors: (*Documentation, Standards), United States Government, Scientific research, Reports, Information retrieval, Handbooks.

Identifiers: COSATI.

The revised standard provides rules which can be used to produce practical uniformity of descriptive cataloging but which are not expected to provide solutions to all problems relating to cataloging technical reports. Its purpose is: (1) To provide rules for descriptive cataloging appropriate to the needs of information centers, documentation centers, and the reports departments of libraries. (2) To provide users with a consistent form of citation and index entries among the products of the various information systems. (3) To enable government agencies to use each others' descriptive cataloging entries with minimal editorial revision, thereby avoiding costly duplicative effort. (4) To provide a guide to other organizations and institutions who wish to formulate compatible descriptive cataloging practices. These rules govern the form of the essential descriptive cataloging elements for scientific and technical reports processed by agencies of the Federal Government. These elements are accession number, corporate author, title, descriptive note, personal author, date, pagination, contract number, report number, availability, supplementary note, and security classification. Additional elements of information and retrieval, such as subject category, descriptors, subject headings, identifiers, abstract numbers, classification numbers, and abstracts, are not included within the scope of this standard. (Author)

AD-641 267 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Electronic Systems Div., L. G. Hanscom Field, Mass. Directorate of Computers.
COMPUTER-CENTERED DATA BASE SYSTEMS,
by Glenn A. Buckles, and Stewart B. Carpenter.
Oct 66, 33p
ESD-TR-66-499

Descriptors: (*Data processing systems, *Management engineering), Computers, Design, Data, Selection, Information retrieval.

Identifiers: ADAM system.

The paper presents a discussion of a specific information system, the Advanced Data Management (ADAM) system, which was established to help the designers and users of large computer-centered data-base systems. The historical background of information systems is included to provide a foundation for discussing the concepts and techniques of ADAM. An application of the ADAM system to a real problem is presented to illustrate the usefulness and practicability of the ADAM design philosophy. The main point which the authors wish to establish is that computer-centered database systems as exemplified by ADAM provide a useful and more advanced philosophy concerning data-base systems development than currently exists. (Author)

N66-30254 **Field 5B**
CFSTI Prices HC$2.00 MF$0.50
Documentation, Inc., College Park, Md.
IMPROVING ANNOUNCEMENT MEDIA FOR TECHNICAL REPORTS.
by D. S. Price. May 66, 26p NASA-CR-62031
Contract NASW-1315

Descriptors: *Computer method, *Photography, *Printer, Abstract, Bibliography, Composition, Computer, Equipment, Index, Literature, Method, Optical, Photographic, Publication, Report, Technical.

For abstract, see STAR 04 17.

N66-32118 **Field 5B**
CFSTI Prices HC$2.00 MF$0.50
North Carolina Science And Technology Research Center, Raleigh.
REGIONAL TECHNOLOGY TRANSFER PROGRAM SECOND QUARTERLY REPORT, OCT. 1 - DEC. 31, 1964.
1964, 27p NASA-CR-60812
Contract NASR-235

Descriptors: *Computer method, *Data transmission, *Information processing, Category, Computer, Conference, Data, Index, Information, Manual, Method, Processing, Procurement, Retrieval, Search, Service, Statistics, Tape, Technology, Transfer, Transmission.

For abstract, see STAR 04 17.

PB-173 261 **Field 5B**
CFSTI Prices: HC$4.60 MF$0.50
Columbia Univ., New York. Bureau of Applied Social Research.
FORMAL AND INFORMAL SATISFACTION OF THE INFORMATION REQUIREMENTS OF CHEMISTS.
Interim rept.
Aug 66, 47p
Grant NSF-GN-185
NSF Scientific Documentation Project.

Descriptors: (*Information retrieval, Scientific personnel), (*Chemistry, Information retrieval), Effectiveness.

Identifiers: Chemists.

PB-173 314 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Federal Council for Science and Technology, Washington, D. C. Committee on Scientific and Technical Information.
STANDARD FOR DESCRIPTIVE CATALOGING OF GOVERNMENT SCIENTIFIC AND TECHNICAL REPORTS.
Oct 66, 54p
Revision No. 1 of PB-181 605.

Descriptors: (*Documentation, Standards), (*Reports, Documentation), Instruction manuals.

Identifiers: Descriptive cataloging.

The revised standard provides rules which can be used to produce practical uniformity of descriptive cataloging but which are not expected to provide solutions to all problems relating to cataloging technical reports. Its purpose is: (1) To provide rules for descriptive cataloging appropriate to the needs of information centers, documentation centers, and the reports departments of libraries. (2) To provide users with a consistent form of citation and index entries among the products of the various information systems. (3) To enable government agencies to use each others' descriptive cataloging entries with minimal editorial revision, thereby avoiding costly duplicative effort. (4) To provide a guide to other organizations and institutions who wish to formulate compatible descriptive cataloging practices. (Author)

PB-173 374 **Field 5B, 14E**
CFSTI Prices: HC$2.00 MF$0.50
Soskuty (O. V.), Frankfurt am Main (West Germany).
MICROFILMING REPROGRAPHY AND ADVANCED DOCUMENTATION EQUIPMENT IN THE FEDERAL REPUBLIC OF GERMANY.
Jun 66, 33p

Descriptors: (*Documentation, West Germany), (*Microfilm, Documentation), Economics, Law, Money, Labor, Commerce, Information retrieval, Standardization, Reproduction, Photography, Statistical data, State-of-the-art reviews.

Contents: Legal background of reprography in Germany: copyright; Standardization. Economic indicators: statistical data; capital investment; labor. The market. State of the art and application of reprography in Germany. Marketing factors and recommended objectives: marketing hardware; marketing American know-how and sys-

tems; approach; advertising; channels of distribution; duty and taxes. Marketability of American equipment: favorable market; not favorable. Competitive equipment: delivery terms.

PB-173 376 **Field 5B, 9B**
CFSTI Prices: HC$4.60 MF$0.50
California Univ., Berkeley. Machine Translation Project.
ON THE ORGANIZATION OF INFORMATION IN AN MT DICTIONARY,
by Sydney M. Lamb, William H. Jacobsen Jr, Russell K. Gardiner, and John H. Wahlgren. Mar 61, 45p
Rept. on NSF Scientific Documentation Project.

Descriptors: (*Machine translation, *Dictionaries), (*Russian language, Dictionaries), Programming (Computers), Grammars, Linguistics, Punched cards, English language.

Identifiers: RUSDIC, Russian-English (Machine translation).

The report gives details of the organization of dictionary information in both the human-oriented and the computer-oriented dictionary, as well as specifications of the intermediate or punched- card form. The description has special reference only to the first version of RUSDIC (i.e.RUSDIC I), which will be used not as a part of a translation program but as part of RUSTAN, the automatic Russian text analyzer. (Author)

PB-173 379 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill. Graduate Library School.
PROPOSAL FOR STUDY ON INDEXING DEPTH AND RETRIEVAL EFFECTIVENESS, SUPPLEMENT.
1965, 7p
Grant NSF-GN-380
NSF Scientific Documentation Project. See also PB-173 380.

Descriptors: (*Subject indexing, Effectiveness), (*Information retrieval, Subject indexing), Documentation, Experimental design.

PB-173 380 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill. Graduate Library School.
STUDIES OF INDEXING DEPTH AND RETRIEVAL EFFECTIVENESS.
Progress rept.,
by Don R. Swanson. Feb 66, 18p PR-1
Grant NSF-GN-380
NSF Scientific Documentation Project. See also PB-173 379.

Descriptors: (*Subject indexing, Effectiveness), (*Information retrieval, Subject indexing), Vocabulary, Documentation, Syntax, Search theory, Abstracts.

Identifiers: Thesauri.

The project consists of a group of studies addressed to the following kinds of questions: is it better to assign few or many index terms to a document, or is there an optimal intermediate number. How specific or how general should they be. Should the indexing vocabulary be free or controlled; if the latter, in what way. How do all of these issues affect 'recall' and 'precision'. A brief theoretical study which develops a relationship between recall, precision, (='relevance') and 'indexing depth' (in the sense of the number of terms assigned) was carried out and is discussed. This study involves a number of simplifying assumptions, and is principally useful for identifying indexing parameters which influence recall and precision. These parameters, once identified, lead to many specific questions on the detailed nature of indexing. (Author)

PB-173 381 **Field 5B**
CFSTI Prices: HC$3.00 MF$0.50
American Institute of Physics, New York.
SYMPOSIUM ON STORAGE AND RETRIEVAL OF INFORMATION.
29 Jan 66, 56p AIP/DRP-66-2
Grant NSF-GN-291
Prepared for presentation at American Physical Society Meeting (Annual) Jan 29 1966, New York. NSF Scientific Documentation Project.

Descriptors: (*Information retrieval, Symposia), (*Data storage systems, Symposia), Indexes, Periodicals, Subject indexing, Solid state physics, Nuclear physics, Abstracts, Documentation, Scientific research.

Contents: Indexing of physics journals; Information problems of solid state scientists; Use of a key-word system in nuclear physics; Discussion after Dr. Way's paper; Cross section data compiling - present and future.

PB-173 455 **Field 5B**
CFSTI Prices: HC$3.00 MF$0.75
Harvard Univ., Cambridge, Mass. Graduate School of Business Administration.
TECHNOLOGY TRANSFER AND THE FLOW OF TECHNICAL INFORMATION IN A LARGE INDUSTRIAL CORPORATION, VOLUME II, APPENDICES A, B, C AND D,
by Curtis P. MacLaughlin, Richard S. Rosenbloom, and Francis W. Wolek. Mar 65, 80p
Grant NsG-253-62
NSF Scientific Documentation Project. See also PB-173 457.

Descriptors: (*Industries, Reports), (*Reports, *Information retrieval), Scientific personnel, Engineering personnel, Job analysis.

PB-173 457 **Field 5B**
CFSTI Prices: HC$2.00 MF$0.50
Harvard Univ., Cambridge, Mass.
TECHNOLOGY TRANSFER AND THE FLOW OF TECHNICAL INFORMATION IN A LARGE INDUSTRIAL CORPORATION,
by Curtis P. McLaughlin, Richard S. Rosenbloom, and Francis W. Wolek. Mar 65, 43p
Grant NsG-253-62
See also PB-173 455.

Descriptors: (*Industries, Reports), (*Reports, *Information retrieval), Scientific personnel, Engineering personnel, Social communication.

A 'user study' was made of the acquisition of useful technical information by scientists and engineers in five divisions of a large industrial corporation. More than 1,200 instances of the acquisition of such information were described on self-administered questionnaires by 430 respondents. Additional data were gathered by personal interviews with more than 30 respondents. The survey shows that the respondent's intention in searching for information, the nature of the source which proved useful, and the medium which joined source and recipient are closely related aspects of the communications process. The report discusses the pattern of relationships among these characteristics, and considers how it is influenced by personal factors, such as experience, and situational factors, such as the type of work done in the engineering section. Explanations for the observed relationships are suggested on the basis of interview data concerning organization structure and policy, geography, and the character of the relevant technologies. Thus, the transfer of technical information is depicted as a complex social process, one in which technology, personal characteristics, organizational values and structure, and the beliefs of significant professional subcultures interact to influence the patterns of behavior. (Author)

AD-640 647 **See Field 5H**

AD-640 652 **See Field 5H**

AD-640 962 **See Field 5G**

AD-641 205 **See Field 9B**

PB-173 370 **See Field 11G**

PB-173 378 **See Field 5G**

5C. ECONOMICS

AD-452 210 **Field 5C**
CFSTI Prices: HC$6.00 MF$1.25
Stanford Research Inst., Menlo Park, Calif.
THE ECONOMIC POTENTIAL OF COMMUNIST CHINA. VOLUME 3: REAPPRAISAL, 1962-1970,
by Yuan-li Wu, Francis P. Hoeber, and Mabel M. Rockwell. May 64, 207p Technical rept. TR-2
Contract DA-49-092-ARO-10
Proj. SRI-4320
See also AD-424 527.

Descriptors: (*China, *Economics), War potential, Analysis, Agriculture, Industries.

Volume 1 (AD-424 526) pointed out that the economic resources of Communist China constrain her military and related options. The growth of the economy to the time of the attempted Great Leap of 1958 was analyzed, together with the subsequent collapse beginning with the agricultural disasters of 1959 and the industrial crisis of 1960-61; it was tentatively concluded '. . . that the economic crisis has probably now been contained and that recovery is foreseeable, but that the ground lost since the collapse of the Great Leap Forward is such that recovery can only be at moderate rates.' The present volume confirms this finding. The estimates of possible achievements by 1970 are somewhat increased as compared with those in Volume 1, the probable rate of growth remaining about the same but the point of departure in 1962 being higher. The estimated 1970 GNP is 15 to 30 percent above that of 1960, which would mean small or negligible gains per capita. The expected growth would allow some limited increases in China's military power, but not the development of a modern war machine or of considerable nuclear power, in the current decade. (Author)

AD-641 021 **Field 5C**
CFSTI Prices: HC$2.00 MF$0.50
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
A REAPPRAISAL OF COST INCENTIVES IN DEFENSE CONTRACTS.
Research paper,
by John Cross. Sep 66, 43p RP-P-282, IDA/HQ-66-5311

Descriptors: (*Costs, Department of Defense), (*Department of Defense, Economics), Commerce, Government procurement, Industries, Federal budgets, Bargaining.

Identifiers: Contracts.

It is suggested that the introduction of cost-sharing necessitates a payment for risk-bearing which in recent years has exceeded any savings which are obtained from increased efficiency, and that calculations of increased efficiency are themselves likely to be overly optimistic. This skepticism, of course, reflects the assumption that the government is not in the market for insurance, and that contractor absorption of risk is of no particular value to the buyer, at least not in relation to its cost. The popularity of incentive contracts is much more easily explained in terms of 'sub-optimizing' behavior of individual procurement officers than it is in terms of the objectives of the organization as a whole. This conclusion is further strengthened by substantial evidence to the effect that 'target costs' are strongly influenced by other features of the contract. Insofar as target costs are raised as sharing ratios are raised, efficiency in contract performance is overstated, even after taking into account the cost of insurance. (Author)

AD-641 156 **Field 5C, 15C**
CFSTI Prices: HC$2.60 MF$0.50
RAND Corp., Santa Monica, Calif.
THE IMPORTANCE OF INDIVIDUAL INDUSTRIES FOR DEFENSE PLANNING,
by D. V. T. Bear, and P. G. Clark. 15 Sep 60, 24p P-2093
Prepared in cooperation with Stanford Univ., Calif. and Williams College, Williamstown, Mass.

Descriptors: (*Industries, *National defense), Management planning, Deterrence, Nuclear warfare, Economics, Urban areas, Population, Commerce.

The object of the analysis described in this paper is to examine, as a guide to sensible peacetime defense preparations, plausible supplies and demands in the U.S. economy after a nuclear war. The presumptions undertaken for the analysis are that deterrence might fail, that the outcome of a future general war would not necessarily be mutual suicide, that the ability to recover economically remains relevant for defense policy, and that individual industries may differ in importance for this objective.

N66-30594 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
TECHNIQUES FOR ESTIMATING COUNTY INCOME IN A SIX-STATE AREA METHODOLOGICAL SUMMARY REPORT, 1950 - 1962.
1 Jun 66, 48p NASA-CR-76250
Contract NASR-63/04/

Descriptors: *Economics, *Statistical analysis, Analysis, Data, Economy, Estimate, Income, Methodology, Middle, Personal, State, Statistical, West.

For abstract, see STAR 04 17.

N66-30597 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
PERSONAL INCOME AND POPULATION IN KANSAS COUNTIES - 1950 - 1962.
1 Jun 66, 40p NASA-CR-76204
Contract NASR-63/04/
Appendix To Nasa-cr-76250

Descriptors: *Economics, *Population, *Statistical analysis, Analysis, Data, Economy, Estimate, Income, Methodology, Middle, Personal, State, Statistical, West.

For abstract, see STAR 04 17.

N66-30598 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
PERSONAL INCOME AND POPULATION IN OKLAHOMA COUNTIES - 1950 - 1962.
1 Jun 66, 40p NASA-CR-76203
Contract NASR-63/04/
Appendix To Nasa-cr-76250

Descriptors: *Economics, *Population, *Statistical analysis, Analysis, Data, Economy, Estimate, Income, Methodology, Middle, Personal, State, Statistical, West.

For abstract, see STAR 04 17.

N66-30603 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
PERSONAL INCOME AND POPULATION IN ARKANSAS COUNTIES - 1950 - 1962.
1 Jun 66, 39p NASA-CR-76208
Contract NASR-63/04/
Appendix To Nasa-cr-76250

Descriptors: *Economics, *Population, *Statistical analysis, Analysis, Data, Economy, Estimate, Income, Methodology, Middle, Personal, State, Statistical, West.

For abstract, see STAR 04 17.

N66-30604 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
PERSONAL INCOME AND POPULATION IN NEBRASKA COUNTIES - 1950 - 1962.
1 Jun 66, 42p NASA-CR-76207
Contract NASR-63/04/
Appendix To Nasa-cr-76250

Descriptors: *Economics, *Population, *Statistical analysis, Analysis, Data, Economy, Estimate, Income, Methodology, Nebraska, Personal, State, Statistical.

For abstract, see STAR 04 17.

N66-30754 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
State Univ. Of Iowa, Iowa City. Bureau Of Business And Economic Research.
PERSONAL INCOME AND POPULATION IN IOWA COUNTIES - 1950-1962 - IOWA APPENDIX TO METHODOLOGICAL SUMMARY REPORT, 1 JUNE 1966.
1 Jun 66, 50p NASA-CR-76303, MRI-2571-M
Contract NASR-63/04/
1966 50 P Refs Prepared For Midwest Res. Inst.

Descriptors: *Data analysis, *Economics, *Population, *Table, Allocation, Analysis, Construction, Contract, Correlation, Data, Finance, Government, Income, Manufacturing, Methodology, Mining, Personal, State, Transportation.

For abstract, see STAR 04 17.

N66-30794 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
PERSONAL INCOME AND POPULATION IN MISSOURI COUNTIES - 1950-1960. MISSOURI APPENDIX TO METHODOLOGICAL SUMMARY REPORT.
1 Jun 66, 31p NASA-CR-76329
Contract NASR-63/04/

Descriptors: *Economics, *Population, *Statistical analysis, Analysis, Data, Economy, Estimate, Income, Methodology, Missouri, Personal, State, Statistical.

For abstract, see STAR 04 17.

N66-32635 **Field 5C**
CFSTI Prices HC$3.00 MF$1.00
Florida State Univ., Tallahassee. Inst For Social Research.
NASA IMPACT ON BREVARD COUNTY SUMMARY REPORT.
by M. A. Griffin, C. M. Grigg, and A. M. Hartsfield. 1966, 130p NASA-CR-76952
Grant NSG-508

Descriptors: *Economics, *Nasa program, Center, Community, Effect, Florida, Increase, Missile, Population, Relation, Space flight.

For abstract, see STAR 04 17.

N66-37516 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
AN ANALYSIS OF THE IMPACT OF FEDERAL EXPENDITURES ON SELECTED SUB-STATE REGIONS FINAL REPORT, 1 JAN. 1962 - 31 JUL. 1966.
by D. W. Daicoff. 1966, 47p NASA-CR-78395
Contract NASR-63/04/

Descriptors: *Economics, *Space program, Analysis, Cost, Defense, Income, Personnel, Region, State, Statistical.

For abstract, see STAR 04 22.

N66-37542 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
THE R AND D FACTOR IN INTERNATIONAL TRADE AND INTERNATIONAL INVESTMENT OF UNITED STATES INDUSTRIES.
by W. Gruber, D. Mehta, and R. Vernon. Jun 66, 46p NASA-CR-78382, CSR-TR-66-8
Grant NSG-496

Descriptors: *Economics, *Industry, *International cooperation, *United states, Development, Export, Product, Research, Tradeoff.

For abstract, see STAR 04 22.

PB-173 246 **Field 5C, 7A, 13B, 18L**
CFSTI Prices: HC$5.60 MF$0.75
Commissariat a l'Energie Atomique, Paris (France).
LE DIMENSIONNEMENT OPTIMUM DES INSTALLATIONS DE PRODUCTION MIXTE D'EAU DESSALEE ET D'ELECTRICITE FAISANT INTERVENIR L'ENERGIE NUCLEAIRE (Choice of Optimum size of Installations for Dual-Purpose Production of Desalted Water and Electricity, Using Nuclear Power),
by Jacques Gaussens. Sep 66, 59p CEA-R-3072
Bilingual text in English and French. Prepared for presentation at Symposium International du Dessalement de l'Eau de Mer, Washington 3-9 October 1965.

Descriptors: (*Desalination, Economics), (*Nuclear power plants, Economics), Water supplies, Electric power production, Costs, Commerce, Distribution (Economics), Consumption, Optimization, France.

A method is used starting with water and power demand curves; this leads to the rational allocation of production costs to water and power within a given market. The power demand curve is needed as it seems improbable to sell at a constant price the enormous quantity of electricity produced by a dual purpose plant. Criteria based on principles of classical economics, help to select objectively desalination methods and plant sizes. On these criteria, normative methods for tariffing action of water and power can be based, while adhering as closely as possible to structure of demand. Examples of such criteria are the maximum profit of the supplier or the maximum satisfaction of the consumers taken collectively. In the first case marginal costs must be equated to marginal revenue, in the second one marginal cost to marginal satisfaction (theory of surpluses). The plant size often determines the choice of desalination process. Therefore the shape of the water demand curve and the economic criterion adopted (public or private ownership, capital restrictions etc.) often determine in this way both size and type of plant. Before deciding on the desalination technique, market surveys and rather subtle economic analyses are therefore necessary. (Author)

PB-173 372 **Field 5C**
CFSTI Prices: HC$2.00 MF$0.50
Societe de Recherche Operationnelle et d'Economie Appliquee, Brussels (Belgium).
PACKAGING MACHINERY AND EQUIPMENT IN BELGIUM.
Sep 65, 48p
Prepared in cooperation with Business and Defense Services Administration, Washington, D.C.

Descriptors: (*Economics, Belgium), (*Belgium, Machines), Commerce, Indusrial equipment, Packaging, Production, Consumption, Industries, United States government.

Identifiers: Market surveys.

The Department of Commerce makes this information available to interested U.S. businessmen

realizing that its scope is limited to the objectives outlined in the survey, but hopeful that it will serve as a stimulus to deeper market analysis on the part of the reader. Where specific dates are mentioned the reader should bear in mind that the survey was based on the latest information available at the time it was prepared. (Author)

PB-173 373 **Field 5C**
CFSTI Prices: HC$3.00 MF$0.75
Dunkley and Friedlander, Milan (Italy).
WELDING EQUIPMENT IN ITALY.
Jun 66, 81p
Prepared in cooperation with Department of Commerce, Washington, D. C. Business and Defense Services Admin.

Descriptors: (*Economics, Italy), (*Italy, Industrial equipment), Welding, Commerce, Production, Consumption, Industries, United States government.

Identifiers: Market surveys.

The Department of Commerce makes this information available to interested U.S. businessmen realizing that its scope is limited to the objectives outlined in the survey, but hopeful that it will serve as a stimulus to deeper market analysis on the part of the reader. Where specific dates are mentioned the reader should bear in mind that the survey was based on the latest information available at the time it was prepared. (Author)

AD-640 651 **See Field 5A**

AD-640 685 **See Field 12B**

AD-640 763 **See Field 51**

PB-173 268 **See Field 13B**

PB-173 375 **See Field 13H**

5D. HISTORY, LAW, AND POLITICAL SCIENCE

AD-234 653 **Field 5D, 15G**
CFSTI Price: HC$4.60
RAND Corp., Santa Monica, Calif.
THE ROLE OF THEORY IN THE STUDY OF CONFLICT,
by T. C. Schelling. 13 Jan 60, 49p RM-2515
Contract AF-49 (638)-700
AD-234 653
See also AD-234 652.

Descriptors: (*Foreign policy, *Deterrence), Theory, Military strategy, Game theory, War potential, Arms control, Warfare, Limited war.

As part of a broader investigation of the objectives of the general and limited war forces of the United States and on the relationship of these objectives to force composition, the hypothesis is developed that political-military strategy on the international level is an underdeveloped science. It is felt that requisite to the study of international relations is a systematic theory of conflict encompassing such concepts as deterrence, brinkmanship, arms race, and accidental war. The need for such a theory is shown, some of the ingredients and characteristics of the theory are suggested, and how it might be applied to practical problems of international affairs is examined. (Author)

AD-416 553 **Field 5D, 15G**
CFSTI Price: HC$9.15
Special Operations Research Office, American Univ., Washington, D. C.
CASEBOOK ON INSURGENCY AND REVOLUTIONARY WARFARE: 23 SUMMARY ACCOUNTS.
by Paul A. Jureidini, Norman A. La Charite, Bert H. Cooper, and William A. Lybrand. Dec 62, 615p

Descriptors: (*Counterinsurgency, Textbooks), Social sciences, Political science, Unconventional warfare, Southeast Asia, Latin America, North Africa, Subsaharan Africa, Middle East, Far East, Europe.

Identifiers: Revolutions (Political).

The casebook provides summary descriptive accounts of 23 revolutions that have occurred in seven geographic areas of the world, mostly since World War II. Each revolution is described in terms of the environment in which it occurred, the form of the revolutionary movement itself, and the results which were accomplished. The casebook is designed: (1) to present a comprehensive introduction to the subject of revolutions; (2) to illustrate the types of political, military, cultural, social, and economic conditions under which revolutions have occurred; and (3) to examine the general characteristics of prior revolutionary movements and some operational problems experienced in waging, or countering, revolutionary warfare. (Author)

AD-640 619 **Field 5D, 15C**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
REVIEW OF THE POLITICS OF THE CHINESE RED ARMY, EDITED BY CHESTER CHENG, THE HOOVER INSTITUTE, 1966,
by Alice L. Hsieh. Aug 66, 5p P-3462
Prepared for publication in the Journal of Asian Studies.

Descriptors: (*Political science, China), (*Armed forces (Foreign), Political science), Reviews, Communism.

AD-640 618 **See Field 15G**

AD-641 285 **See Field 5K**

5E. HUMAN FACTORS ENGINEERING

AD-127 071 **Field 5E, 17I**
CFSTI Price: HC$1.60
Systems Research Field Lab., Johns Hopkins Univ., Jamestown, R. I.
SPEED OF READING TARGET INFORMATION FROM A DIRECT-READING, COUNTER-TYPE INDICATOR VERSUS CONVENTIONAL RADAR BEARING-AND-RANGE DIALS.
Memorandum rept.,
by A. Chapanis. 1 Nov 46, 13p
Contract N5ori-166 (01)
SPECDEVCEN-MR-166-I-3

Descriptors: (*Radar equipment, *Human engineering), (*Radar operators, Performance (Human)), Detection, Errors, Experimental design, Test methods, Radar targets.

The experiment measured the time required by operators to read bearing and range information from four types of standard Navy radar equipment (the SG and SR radars and VF and VJ remotes), and from a direct-reading, counter-type bearing and range indicator of experimental design. The results show that the experimental indicator enables operators to read bearing and range information in about one-half the time required for similar readings from the four standard units. The data also show that the fewest number of errors occurred in target information read from the experimental indicator. Most of the errors made in reading target settings from the radars occurred in the bearing information. (Author)

AD-144 672 **Field 5E**
CFSTI Price: HC$2.60
Industrial Engineering Lab., New York Univ., N. Y.
RELATIVE PERFORMANCE FOR CRANKING A HAND WHEEL AT DIFFERENT POSITIONS ON A VERTICAL SURFACE.
Technical rept.,
by K. O. William Sandberg, and Harold L. Lipschultz. 18 Apr 48, 25p
Contract N5ori-166 (01)
SPECDEVCEN-TR-166-I-22

Descriptors: (*Instrument panels, Human engineering), Performance (Human), Hands, Posture, Test methods, Measurement, Anthropometry, Rotation.

The investigation measured the speed with which subjects can crank a hand wheel at different positions on a vertical surface. Eleven male subjects were used. During all tests, the subjects were seated in a straight-backed chair whose back was 24 in. from the vertical surface. Test positions were spaced at 4-in. intervals vertically and horizontally and covered a total area of 44 in. (vertically) and 40 in. (horizontally). In general, the areas of best performance for the left hand were higher on the vertical surface than similarly rated areas for the right hand. The optimum areas (95% of maximum performance) for each hand are below eye level and on the same side of the body mid-line as the hand being used. The relative performance at all test positions is charted. No conclusive relationships were found between cranking performance and certain body dimensions of operators. (Author)

AD-46 732 **Field 5E, 17I**
CFSTI Price: HC$2.60
Industrial Engineering Lab., New York Univ., N. Y.
TARGET INDICATION AS A FUNCTION OF INSTRUCTION,
by H. L. Lipschultz, and K. O. W. Sandberg. 20 Nov 47, 24p
Contract N5-ori-166 (01)
SPECDEVCEN-166-I-34

Descriptors: (*Radar operators, Performance (Human)), (*Search radar, *Human engineering), Radar targets, Detection, Errors, Range finding.

The investigation was conducted to determine the accuracy and speed with which an operator can indicate targets under three separate sets of instructions. The principal effect of the instructions was to divide the operators into two groups, those that observed the target once (Speed-instructions) and those that observed the target two or more times (Accuracy-instructions). Approximately 200 yards greater accuracy was obtained when the operator observed the target two or more times. The use of two blip observations seems to give optimum accuracy and speed for any rate of antenna operation. Greatest accuracy was achieved when the operators were instructed to use the stopping-of-the-antenna method. The range error increased with operator speed. The working time increased when greater accuracy was sought.

AD-464 326 **Field 5E, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Human Factors Research, Inc., Los Angeles, Calif.
SONAR OPERATOR DETECTION PERFORMANCE AT SEA,
by C. H. Baker, E. L. Parker, and J. C. Rittger. Apr 64, 23p Technical rept. TR-206-26
Contract Nonr-2649 (00)
Proj. NR-153-199
Report on Human Factor Problems in Anti-Submarine Warfare.

Descriptors: (*Sonar personnel, Performance (Human)), (*Antisubmarine warfare, Sonar personnel), Sonar equipment, Operation, Sonar targets, Detection, Gain, Voltage, Effectiveness, Underwater object locators, Naval training, Identification systems, Sonar.

An earlier experiment using training equipment ashore indicated that a significant improvement

could be expected in sonar target detection performance by employing bias and gain voltages which differed from those typically employed. This report describes a similar, though briefer, experiment undertaken at sea with an AN/SQS-23A sonar. In a preliminary experiment, using project personnel as observers, detection performance was determined for several values of bias and gain. In the main experiment detection performance of the ship's eight sonar operators was compared when (1) employing their favored values of bias and gain, and when (2) employing values selected as a result of the preliminary experiment. It was found that by increasing the gain (actually decreasing the gain voltage 3.3 volts) above that typically selected by operators of an AN/SQS-23A sonar operating at sea, target detection performance with respect to targets generated by the sonar test set was improved by approximately 3 decibels. This result provides objective evidence for the validity of the frequently made observation that many sonar operators search at a gain level substantially below the optimum. (Author)

AD-640 971 **Field 5E, 1B**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Inst., Oklahoma City, Okla.
HUMAN FACTORS IN GENERAL AVIATION ACCIDENTS,
by J. Robet Dille, and Edward W. Morris. Jul 66, 14p
AM-66-27

Descriptors: (*Aviation accidents, *Human engineering), Aviation safety, Aviation medicine.

During the twelve months ending October 31, 1965, there were 122 fatal general aviation accidents in the Western Region in which the Regional Flight Surgeon's office was notified and the wreckage was located within one week. Autopsies were obtained on 86 pilots and blood alcohol determinations were obtained on 83 of these. No accidents were found to be definitely due to medical conditions but a psychiatric problem is the probable cause of one. In addition, 25 wore corrective lenses and 20 had other recorded physical defects. Drugs were found on three but were not found to be a causal factor; possibly significant barbiturate levels were found in two accidents. Blood ethyl alcohol levels > 30 mg % were found in 17 (20.5%); five had levels greater than 250 mg %. The relationships of experience, occupation, local reputation and time of day to alcohol involvement are discussed. Carbon monoxide, agricultural chemicals, and fatigue are among other causes found for fatal accidents. The role of medical conditions, alcohol and posticides are discussed for the few non-fatal accidents that were medically investigated. The development of human factors accident investigation is briefly discussed. Increased aviation safety is possible with improved community and medical actions and increased medical participation in accident investigation. (Author)

AD-72 81 **Field 5E, 171**
CFSTI Price: HC$1.00
Systems Research Field Lab., Johns Hopkins Univ., Jamestown, R. I.
DETECTION OF NEW TARGETS ON A CATHODE RAY TUBE (PPI PRESENTATION) WITH AND WITHOUT AN ASSOCIATED AUDITORY SIGNAL.
Memorandum rept.,
by J. W. Gebhard. 10 Feb 47, 11p
Contract N5-ori-166 (01)
SPECDEVCEN-MR-166-I-10

Descriptors: (*Target discrimination, *Auditory signals), Radar targets, Detection, Errors, Radar operators, Performance (Human), Human engineering.

Two experiments were performed to determine whether the detection of a new target appearing on a radar plan position indicator (PPI) could be improved by synchronizing an auditory signal with the new blip. In the first experiment, ten faint targets were presented on a PPI, and after one sweep of observation an eleventh one appeared. In the second, ten saturated targets were presented among complex land and open sea returns, and after one sweep of observation an eleventh one appeared. The operators identified and reported the new targets upon discovery. The results of both experiments showed that detection of new targets accompanied by an auditory signal was accomplished without error, whereas targets searched for by visual means alone were found only half the time. (Author)

N66-30617 **Field 5E**
CFSTI Prices HC$2.00 MF$0.50
Martin Co., Denver, Colo. Aerospace Div.
HUMAN ENGINEERING DATA AND CONCEPTS FOR HANDLING ADVANCED NUCLEAR SYSTEMS IN SPACE RESEARCH AND TECHNOLOGY IMPLICATIONS REPORT.
Jul 65, 29p NASA-CR-76149, CR-65-89
Contract NAS8-11425

Descriptors: *Equipment specifications, *Ferry spacecraft, *Interplanetary spacecraft, *Manned orbital research laboratory (morl), *Systems design, Description, Design, Equipment, Ferry, Laboratory, Lunar, Maintenance, Maneuverability, Manned, Morl, Nuclear, Orbital, Radiation, Reactor, Research, Snap program, Spacecraft, Specification, System, Vehicle.

For abstract, see STAR 04 17.

N66-30798 **Field 5E**
CFSTI Prices HC$1.00 MF$0.50
Texas Christian Univ., Fort Worth.
A MODEL FOR THE SOCIAL SYSTEM FOR THE MULTIMAN EXTENDED DURATION SPACE SHIP.
by S. B. Sells. 1965, 12p NASA-CR-76330
Contract NGR-44-009-008

Descriptors: *Confinement, *Group behavior, *Human behavior, *Social isolation, Behavior, Flight, Group, Human, Isolation, Long, Model, Period, Principle, Sociology, Space, Spacecrew, Stress (biol), Structure.

For abstract, see STAR 04 17.

N66-37540 **Field 5E**
CFSTI Prices HC$1.00 MF$0.50
California Univ., Berkeley. Space Sciences Lab.
THE DICHOTOMIES OF ENGINEERING DESIGN.
by I. I. Mitroff. Aug 66, 23p NASA-CR-78381
Grant NSG-243-62
Its Internal Working Paper No. 51

Descriptors: *Engineering development, *Logical design, *Programming, Aspect, Computer, Human, Method, Psychology, Simulation, Theory.

For abstract, see STAR 04 22.

AD-640 571 **See Field 17B**

AD-640 717 **See Field 1D**

AD-640 891 **See Field 1C**

AD-641 287 **See Field 22A**

5G. LINGUISTICS

AD-435 103 **Field 5G, 9B**
CFSTI Price: HC$3.60
Linguistic Research Center, Univ. of Texas, Austin.
QUARTERLY PROGRESS REPORT NO. 3, 1 NOVEMBER 1963-31 JANUARY 1964,
by W. P. Lehmann. Feb 64, 32p 19, LRC-64-P19
Contract DA-36-039-AMC-02162 (E)

Descriptors: (*Machine translation, *Language), (*Linguistics, Machine translation), Theory, Data processing systems, Programming (Computers), Design, Syntax, Grammars.

Identifiers: Monolingual recognition program, IBM 7040, IBM 7090.

Progress is reported in the development of two generalized computer systems: the first designed to implement automatic translation of languages, the second to support basic research in linguistics. The systems complement each other in that programs prepared for each are applicable to, and needed in, the other. The common system design contains three sections: one for control, a second for language data processing, and a third for linguistic information processing, the first two sections are now operational, in the third, monolingual recognition programs for performing lexical and syntactic analysis and display have been made operational. The programs, which have been converted to operate on the IBM 7040 as well as the IBM 7090 computer, are being tested with english, german, russian, and chinese language data. (Author)

AD-640 570 **Field 5G**
CFSTI Prices: HC$3.00 MF$0.75
Mitre Corp., Bedford, Mass.
A SCHEMA FOR SENTENCE COORDINATION,
by S. A. Schane. Aug 66, 67p MTP-10
Contract AF 19 (628)-5165
Proj. AF-7020
ESD-TR-66-305

Descriptors: (*English language, Linguistics), Grammars, Transformational grammars.

Identifiers: Conjunctions.

A linguistic analysis of the coordinate conjunction construction in English is given. It is shown that a standard transformational rule is insufficiently powerful to generate coordinate constructions correctly, and a broadening of linguistic theory in the form of a Principle for Conjunction is proposed. Grammatical rules are developed for the generation of a wide variety of coordinate constructions, and their place in the MITRE grammar of English is discussed. (Author)

AD-640 617 **Field 5G**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE QUANTIFICATION OF FUNCTIONAL LOAD: A LINGUISTIC PROBLEM,
by C. F. Hockett. Oct 66, 32p RM-5168-PR
Contract AF 49 (638)-1700

Descriptors: (*Phonetics, Analysis), Linguistics.

Measures of the linguistic load carried by a contrast are developed for three cases, in which the contrasts are taken to be, respectively, phonemic, allophonic, and componential. The load carried by a contrast is non-negative and zero if the 'contrasted' units are identical, or if neither occurs in any environment in which the other is found. The measure proposed is the change in entropy of the system if the contrasted phonemes are coalesced; some problems peculiar to the allophonic case are discussed. If each distinct bundle of components is an allophone, the entropy of a given system is independent of point of view (phonemic, allophonic, or componential). (Author)

AD-640 757 **Field 5G**
Not available from CFSTI.
Hebrew Univ., Jerusalem (Israel).
SOME RECENT RESULTS IN THEORETICAL LINGUISTICS,
by Y. Bar-Hillel. 1960, 7p
Contract N-62558-2214
Prepared for presentation at Symposium on Models in Linguistics.

Availability: Published in Logic, Methodology and Philosophy of Science, Proceedings of the 1960 International Congress 1962, p551-7.

Descriptors: (*Linguistics, Theory), Syntax, Grammars, Israel.

AD-640 962 **Field 5G, 5B**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A DEEP INDEX OF DERIVATIONAL MORPHOLOGY,
by Dean S. Worth. Sep 66, 35p RM-5143-PR
Contract AF 49 (638)-1700

Descriptors: (*Indexes, *Russian language), Documentation, Linguistics, Abstracts, Classification, Information retrieval.

The memorandum describes a projected 'Deep Index' to the extant literature on Russian derivational morphology. The memorandum describes the type of literature being abstracted, the classification of information into discrete categories for retrieval, the steps taken to prepare data for conversion to machine format, and the transliteration and abbreviation conventions used in the Index. An example of Russian scholarly text is appended, together with the format in which this text appears after processing. (Author)

PB-173 290 **Field 5G**
CFSTI Prices: HC$3.00 MF$0.75
Carnegie Inst. of Tech., Pittsburgh, Pa.
ON THE ANALYSIS OF HUMAN PROBLEM SOLVING PROTOCOLS,
by Allen Newell. 27 Jun 66, 67p
Grant PHS-MH-07722-02
Prepared for presentation at the International Symposium on Mathematical and Computational Methods in the Social Sciences, Rome, July 4-9, 1966.

Descriptors: (*Computational linguistics, Problem solving), (*Problem solving, Analysis), Verbal behavior, Performance (Human), Reaction (Psychology), Linguistics, Human engineering.

The last decade has seen the emergence of information processing theories of human problem solving, expressed usually as computer programs that simulate behavior. These theories have led to a resurgence of interest in protocols as a source of data. The term protocol generally refers to a record of the time sequence of events. In the present context it includes also the continuous verbal behavior of the subject operating under instructions to 'think aloud.' Protocols match well some of the strong points of information processing theories, but also have several weak features. The purpose of this paper is to discuss the analysis of protocol data and to suggest one new line of attack for strengthening it. The intent is somewhat methodological, but some new material will be introduced. (Author)

PB-173 311 **Field 5G, 9B**
CFSTI Prices: HC$5.00 MF$1.00
Pennsylvania Univ., Philadelphia. Dept. of Linguistics.
A MATHEMATICAL AND APPLIED INVESTIGATION OF TREE STRUCTURES FOR COMPUTER SYNTACTIC ANALYSIS.
Doctoral thesis,
by Anatol W. Holt. Jun 63, 161p
Report on NSF Transformation Project NSF Scientific documentation project.

Descriptors: (*Syntax, Analysis), Computers, English language, Transformational grammars, Topology.

The mathematical part is an investigation of trees - or more exactly, of finite, rooted, oriented and ordered trees; a variety of graph-theoretic structure which is frequently encountered in computer and language related fields of study. The applied part deals with the problem of mechanizing the analysis of written English sentences into transformational constituents. (Author)

PB-173 377 **Field 5G**
CFSTI Prices: HC$6.60 MF$0.75
California Univ., Berkeley.
OUTLINE OF STRATIFICATIONAL GRAMMAR,
by Sydney M. Lamb. 1962, 65p
NSF Scientific Documentation Project.

Descriptors: (*Grammars, Analysis), Linguistics, Phonetics, Language.

The system presented here is called stratificational because one of its chief features is the recognition of a series of strata or structural layers in language. A language, by its nature, relates sounds (or graphs, i.e. marks on paper or the like) to meanings, and this relationship is a very complex one which turns out to be analyzable in terms of a series of code-like systems, each of which connects two neighboring strata. The topmost structural stratum, the sememic, has units directly related to meaning. These sememes may be thought of as encodable into units of the next lower stratum, which in turn are themselves encodable, and so on, until one comes out with units directly related to speech or writing (i.e. with phonemes or graphemes) which, finally, may be spoken or written as the case may be. The code relating each pair of neighboring strata is a set of stratificational rules, whose form is described.

PB-173 378 **Field 5G, 5B**
CFSTI Prices: HC$3.60 MF$0.50
California Univ., Berkeley. Machine Translation Project.
THE REFINED GRAMMAR CODES OF RUSSIAN NONCHEMICAL NONSUFFIXAL ALPHABETIC LEXES,
by C. Douglas Johnson, Luis G. Ireland, Sydney M. Lamb, and John H. Wahlgren. Mar 62, 34p
NSF Scientific Documentation Project.

Descriptors: (*Russian language, *Machine translation), (*Grammars, Russian language), Dictionaries, Linguistics.

PB-173 441 **Field 5G**
CFSTI Prices: HC$5.00 MF$1.00
Ohio State Univ. Research Foundation, Columbus.
PROJECT ON LINGUISTIC ANALYSIS,
by Charles J. Fillmore, Shuan Fan Huang, D. Terence Langendoren, Leroy F. Meyers, and James Yang. Aug 66, 164p Rept. no. 13, OSURF-1685-6
Grant NSF-GN-174

Descriptors: (*Linguistics, Analysis), Language, Syntax, Chinese language, English language, Grammars, Programming (Computers).

Contents: Toward a modern theory of case; Subject and object in mandarin; Some problems concerning the English expletive 'It'; Corrections and additions to 'Tree Representations in Linguistics'; Some comit subroutines for testing generative grammars.

AD-640 647 See Field 5H

AD-640 814 See Field 5I

AD-641 132 See Field 9D

5H. MAN-MACHINE RELATIONS

AD-640 647 **Field 5H, 5B, 5G, 9B K**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
ON-LINE INTERACTIVE DISPLAYS IN APPLICATION TO LINGUISTIC ANALYSIS AND INFORMATION PROCESSING AND RETRIEVAL.
Professional paper,
by R. F. Simmons. 6 Sep 66, 22p SP-2432/001/00
Contract AF 19 (628)-5166
Prepared for presentation at the Symposium on Man/Machine Interaction, Paris (France), 10-17 Oct 66. See also AD-615 718, AD-632 473.

Descriptors: (*Man-machine systems, Display systems), Information retrieval, Computational linguistics, Reports, Bibliographies.

Identifiers: On-line systems, Kernelization (Sentences), BOLD, Sentences.

As computers are used for increasingly complex operations such as retrieving documents and analyzing sentences, it becomes apparent that human decision-making is still an essential element of the process. The use of the on-line interactive capability of today's third-generation computers supported by typewriter and display scope terminals makes the construction of computer-aided systems for these complex tasks an attractive approach. Two such systems are described in the paper. One is BOLD, a document retrieval system that offers the user an on-line browsing capability as well as the ability to retrieve documents or construct bibliographies using computer-driven display scopes and typewriters. The other is a sentence-analysis system that computes dependency analyses, phrase structure analyses and kernel sets for each sentence it is given. This system produces and displays multiple analyses and allows the user to correct them or to select those which are satisfactory. The conclusion is that for some time to come complex information processing systems--particularly those concerned with natural languages--will remain at the level of semiautomatic computer aids to human information processing. As such, their usefulness can be maximized by optimal use of interactive display technology. (Author)

AD-640 652 **Field 5H, 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
UTILIZATION OF ON-LINE INTERACTIVE DISPLAYS.
Professional paper,
by H. Borko. 22 Aug 66, 35p SP-2575
Prepared for presentation at the Congress on Information System Science and Technology (3rd), Buck Hill Falls, Pennsylvania, November 20-23 1966.

Descriptors: (*Man-machine systems, Display systems), (*Information retrieval, Man-machine systems), Programming (Computers), Problem solving, Decision making, Data processing systems, Syntax, Teletype systems, Cathode ray tubes, Computers.

The versatility and advantages of using on-line interactive displays are illustrated by examples from (1) the General Purpose Display System (GPDS), (2) the Pattern Learning Parser (PLP II), and (3) the Bibliographic On-Line Display System (BOLD). Although these systems are designed for different purposes they all utilize displays as communication channels by which the man and the machine are able to engage in a dialog and work together to solve problems. The computer processes data rapidly and displays the results. The information provided in the displays enables the user to steer and control the step-by-step progress of the program. Not only are problems solved more efficiently, but the users are more satisfied by the results achieved. (Author)

N66-30532 **Field 5H**
CFSTI Prices HC$3.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Advance Biotechnology Dept.
THE EFFECTS OF CENTRIFUGE RADIUS ON THE PERFORMANCE OF ENTRY TASKS.
by W. C. Middleton, and W. J. White. Jun 66, 32p
NASA-CR-65421, DAC-59274
Contract NAS9-4166

Descriptors: *Centrifuge, *Human performance, *Tracking, *Transfer of training, Apollo project, Discrete, Effect, Entry, Human, Performance, Profile, Radius, Response, Task, Training, Transfer.

For abstract, see STAR 04 17.

N66-32141 **Field 5H**
CFSTI Prices HC$1.00 MF$0.50
Texas Univ., Austin. Defense Research Lab.
STUDIES OF AUDITORY INFORMATION PROCESSING EMPHASIZING THE APPLICATION OF SIGNAL DETECTABILITY THEORY TO THE AUDITORY SENSORY RESPONSES SEMI-ANNUAL REPORT, 1 DEC. 1965 - 31 MAY 1966 AND EIGHTH QUARTERLY STATUS REPORT, 1 MAR. - 31 MAY 1966.
by L. A. Jeffress. 27 Jun 66, 10p NASA-CR-76560
Contract NASA ORDER R-129, NONR-3579/04/

Descriptors: *Auditory signal, *Brightness discrimination, *Energy band, *Human reaction, *Research project, *Signal fading rate, Acoustic, Auditory, Band, Brightness, Detection, Discrimination, Duration, Ear, Electric, Energy, Fading, Human, Integration, Model, Noise, Project, Rate, Reaction, Rectifier, Research, Response, Signal.

For abstract, see STAR 04 17.

N66-32260 **Field 5H**
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Man-vehicle Control Lab.
STUDIES OF HUMAN DYNAMIC SPACE ORIENTATION USING TECHNIQUES OF CONTROL THEORY STATUS REPORT.
by Y. T. Li, and L. R. Young. Jun 66, 31p NASA-CR-76709, MV-66-1
Grant NSG-577

Descriptors: *Control system, *Human performance, *Man-machine system, *Operator performance, *Space orientation, Biological, Control, Dynamic, Effect, Human, Man, Man-machine, Manual, Mathematics, Model, Motion, Operator, Orientation, Performance, Space, Subsystem, System, Theory, Vehicle, Vestibular.

For abstract, see STAR 04 17.

N66-32335 **Field 5H**
CFSTI Prices HC$5.00 MF$1.00
Douglas Aircraft Co., Inc., Long Beach, Calif.
EXPERIMENTAL STUDY OF ACOUSTIC DISPLAYS OF FLIGHT PARAMETERS IN A SIMULATED AEROSPACE VEHICLE.
by A. A. Burrows, J. A. Emery, R. F. Gabriel, and D. Katz. Jul 66, 162p NASA-CR-509
Contract NAS4-664

Descriptors: *Acoustics, *Detection, *Display system, *Target simulation, Aerospace, Display, Evaluation, Flight, Information, Location, Parameter, Presentation, Simulation, System, Target, Vehicle, Visual.

For abstract, see STAR 0 17.

N66-37142 **Field 5H**
CFSTI Prices HC$3.25 MF$1.00
Bolt, Beranek, And Newman, Inc., Cambridge, Mass.
STUDIES OF MULTI-VARIABLE MANUAL CONTROL SYSTEMS - TWO AXIS COMPENSATORY SYSTEMS WITH COMPATIBLE INTEGRATED DISPLAY AND CONTROL.
by J. I. Elkind, and W. H. Levison. Aug 66, 153p NASA-CR-554
Contract NASW-668

Descriptors: *Control system, *Display system, *Manual control, Axis, Compensator, Control, Display, Human, Integration, Manual, Multiple, System, Two, Variable.

For abstract, see STAR 04 22.

N66-37268 **Field 5H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DECK MOTION SIMULATOR PROGRAM - HORIZONTAL SINUSOIDAL OSCILLATION EFFECTS UPON PERFORMANCE OF STANDING WORKERS.
by J. S. Seeman, and R. B. Williams. Oct 66, 48p NASA-TN-D-3594

Descriptors: *Human performance, *Oscillation, *Vibration simulator, Complex, Deck, Effect, Horizontal, Human, Launch, Performance, Saturn v launch vehicle, Simulator, Sinusoid, Vibration, Worker.

For abstract, see STAR 04 22.

AD-640 571 **See Field 17B**

AD-641 132 **See Field 9D**

5I. PERSONNEL SELECTION, TRAINING, AND EVALUATION

AD-101 548 **Field 5I, 5J**
CFSTI Price: HC$1.60
Adjutant General, Dept. of the Army, Washington, D. C.
SURVEY OF LITERATURE ON DEVELOPMENT OF CRITERIA FOR MARGINAL MANPOWER,
by S. H. King, and W. G. Hoyt. Mar 56, 15p PRB-TRN-54

Descriptors: (*Military personnel, Selection), (*Psychometrics, Military personnel), Military requirements, Intelligence tests, Performance tests, Army personnel, Manpower studies.

A research program was initiated to determine the feasibility of utilizing mentally marginal personnel in Army jobs. An analysis of the research problem indicated that it is first necessary to develop a reliable and objective measure of usefulness to the Army. With a criterion measure of usefulness that is based on a comparison or 'weighing' of job contribution against costs of maintaining the productivity of each marginal individual, the conditions under which marginal personnel would be useful can be specified. The research literature was surveyed for purposes of evaluating methods that have been applied in the attempt to measure on-the-job usefulness of personnel with low mental ability. Paper-and-pencil tests, performance or job-sample tests, evaluations or ratings by superiors, career service data, assignment records, and neuropsychiatric evaluations have been used. It is not possible to determine, however, whether the results with these methods reflect genuine usability or are merely artifacts of the shortcomings of each method. More important, no previous research methods were found which separated and then directly balanced job assets against maintenance costs. (Author)

AD-191 **Field 5I, 5J**
CFSTI Price: HC$5.60
Adjutant General, Dept. of the Army, Washington, D. C.
DEVELOPMENT OF ARMED FORCES QUALIFICATION TEST AND PREDECESSOR ARMY SCREENING TESTS, 1946-1950,
by J. E. Uhlaner, and Daniel J. Bolanovich. 7 Nov 52, 60p PRS-976

Descriptors: (*Psychometrics, Military personnel), (*Military personnel, Selection), (*Test construction (Psychology), Army), Classification, Recruiting, Standardization.

The problems encountered in the development of the AFQT are summarized, and the outcome of attempts to solve the problems is described. Experience with earlier tests is discussed to permit a better understanding of the development of the AFQT. A comparison of the AFQT scores obtained under operational conditions and under standard conditions indicated the following: (1) Slippage occurred in the operational scores for enlistees and inductees as indicated by the pile-up of scores at the cut-point; (2) under standard administration, the pile-up at the cut-point was absent, and the original standardization percentiles were obtained; and (3) the correction of operating conditions of test administration was considered the solution for avoiding the discrepancies which appear in operational AFQT scores.

AD-640 567 **Field 5I**
CFSTI Prices: HC$2.00 MF$0.50
Personnel Research Lab., Lackland AFB, Tex.
EVALUATION OF AIRMAN JOBS BY FOUR CATEGORIES OF RATERS,
by Joe T. Hazel, and Douglas K. Cowan. Jun 66, 33p PRL-TR-66-3
Proj. AF-7734
Task 773402

Descriptors: (*Job analysis, *Air force personnel), Analysis of variance, Psychometrics, Correlation techniques, Reliability.

Identifiers: Evaluation.

To investigate differences between rater groups in their evaluation of airman jobs, four groups of raters each evaluated a sample of 200 airman job descriptions. The groups consisted of senior NCOs, lieutenants, captains, and field grade officers. The jobs were evaluated in terms of merited grade, merited pay, and the relative importance of five job requirement factors. Within groups each job was evaluated by five raters and across all groups by 20 raters. The raters also indicated their confidence in the grade level ratings they made. The analyses used to compare the four groups were concerned with differences in means, distribution variability, and reliability of ratings and the predictive efficiency of the five job requirement factors. These analyses revealed two statistically significant ($P > .01$) differences among groups. The mean of the field grade officers expressed greater confidence in their assigned grade ratings than the other groups. However, the NCO difference seemed of little practical consequence, and there was agreement among the groups with regard to the reliability and homogeneity of assigned ratings, and the level of predictive efficiency of the five job requirement factors. The present findings support the use of a composite groups of raters to evaluate airman jobs. (Author)

AD-640 653 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
THE DESIGN OF A MAN-MACHINE COUNSELING SYSTEM.
Professional paper,
by J. F. Cogswell, C. P. Donahoe Jr, D. P. Estavan, and B. A. Rosenquist. 30 Sep 66, 20p SP-2576/001/01
Presented at the American Psychological Association Convention, 4 September 1966, New York, New York.

Descriptors: (*Man-machine systems, *Personnel management), Design, Computers, Data processing systems, Education, Selection, Decision making.

The counseling operations at a large senior high school and a large junior high school in the Los Angeles School District were analyzed. The counselors at the schools and the System Development Corporation research team formulated a plan for using the computer to handle the major information processing tasks in the counseling operation. Plans include storage of all student data in the

computer for easy processing and retrieval; tracking of students through their school progress by the computer to identify counseling problems; automated on-line generation and application of multiple prediction formulas; automated scheduling and automated generation of reports; and automated interviews to help students in the areas of course programming, post-high-school educational planning, and vocational exploration. Initial work on the computer programs is in progress. (Author)

AD-640 654 **Field 5I, 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
AN EXPLORATORY INVESTIGATION OF PROGRAMMER PERFORMANCE UNDER ON-LINE AND OFF-LINE CONDITIONS.
Professional paper,
by E. E. Grant, and H. Sackman. 2 Sep 66, 44p
SP-2581
Contract AF 19 (628)-5166, ARPA Order-773

Descriptors: (*Programmers, Performance tests), Statistical analysis, Programming languages, Correlation techniques, Analysis of variance, Combinatorial analysis, Performance (Human), Time studies, Experimental data, Factor analysis, Personnel management.

An experiment conducted at System Development Corporation compared the program debugging performance of programmers working under conditions of on-line and off-line access to a computer. This paper describes that experiment; it is the first known study measuring the performance of programmers under controlled conditions for a standard task. Two groups of six programmers each, comprising a total sample of 12 subjects, debugged two types of programs under on-line and off-line conditions in accordance with a Latin-Square experimental design. The on-line condition was the normal mode of operation for the SDC Time-Sharing System; the off-line condition was a simulated closed-shop with a two-hour turn around time. Statistically significant results indicated faster debugging under on-line conditions. Perhaps the most important practical finding of this study, overshadowing on-line/off-line differences, concerned the large and striking individual differences in programmer performance. Attempts are made to relate observed individual differences to objective measures of programmer experience and proficiency through factorial techniques. In line with the exploratory objectives of this study, methodological problems encountered in designing and conducting this type of experiment are described, limitations of the findings are pointed out, hypotheses are presented to account for the results and suggestions are made for further research. (Author)

AD-640 656 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
AN EMPIRICAL NAVY ACTIVITIES PREFERENCE BLANK SCALE TO PREDICT CLASS 'A' SCHOOL ACHIEVEMENT.
Research memorandum,
by Norman M. Abrahams, William H. Githens, and Idell Neumann. Oct 66, 12p SRM-67-7
Proj. PF-016070102

Descriptors: (*Naval personnel, Selection), (*Psychometrics, Naval personnel), Achievement tests, Performance (Human), Students, Test construction (Psychology), Statistical analysis.

The study focused on the construction of an NAPB Achievement Scale that would improve prediction of Navy 'A' school performance. The achievement criterion was obtained by classifying men as 'high achievers' whose actual school performance markedly surpassed that predicted by BTB tests, and by classifying as 'low achievers' those whose actual performance fell markedly below the predicted level. A multiple regression analysis of the high and low achievers identified the single responses and response configurations on the NAPB which were significantly related to this 'achievement' variable. The total sample of high, average, and low achievers was then scored on the NAPB Achievement Scale and their school grades were related to this score both (1) alone, and, (2) in combination with BTB. In addition, possible moderator effects of the 'achievement' score and GCT scores were examined. In general, validities were negligible and cross-validation did not seem warranted. (Author)

AD-640 657 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Army Enlisted Evaluation Center, Indianapolis, Ind.
READABILITY AND VALIDITY OF ITEMS IN TESTS OF JOB PROFICIENCY,
by John S. Brand. Aug 66, 18p Technical Research Study-25
Proj. USAEEC-638

Descriptors: (*Army personnel, Selection), (*Achievement tests, Test construction (Psychology)), Vocabulary, Reliability, Reading, Numbers, Correlation techniques.

The study applies the Gunning Fog Count measure of readability to individual four-choice items measuring job knowledge, and then investigates the relationship between item readability and validity. The Gunning Fog Count is based on average sentence length and percentage of words having three or more syllables. Item validity coefficients were point-biserial correlations against a criterion of three peer ratings on a scale of overall job proficiency. Results support the hypothesis that the probability for satisfactory item validity is decreased beyond certain levels of reading difficulty. These levels vary with different types of jobs. (Author)

AD-640 681 **Field 5I**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
COMPUTER-AIDED TEACHING OF DYNAMIC SYSTEM BEHAVIOR,
by Ronald C. Rosenberg. Nov 65, 122p DSR-9960-5
Contract AF 19 (628)-3317
Proj. AF-7682
Task 76804
ESD-TR-66-260

Descriptors: (*Teaching methods, Digital computers), (*Dynamics, Teaching methods), Linear systems, Power, Engineering.

A Dynamic Systems Laboratory based on a time-shared digital computer is described. The laboratory simulates the time domain behavior of linear, lumped-parameter passive and active dynamic systems. The response variables, including powers and energies, are available in tabular and graph form, and rapid access data are generated and displayed by an analog computer under digital control. Problems are specified in a circuit-like notation called bond graphs. The Dynamic Systems Laboratory was used as the basis of an open-loop teaching system. An experiment is discussed in which four subjects were provided with a guidebook and access to the laboratory. Generalizations about the behavior of linear first- and second-order systems were developed by the subjects, based largely on experimentally obtained data. The efficiency of the teaching process was found to depend, in large part, on the student's ability to monitor himself. (Author)

AD-640 712 **Field 5I**
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Orlando, Fla.
EFFECT OF PERSPECTIVE GEOMETRY TRAINING ON TARGET AREA LOCATION.
Final rept., 1 Apr-15 Oct 66,
by M. A. Larue, W. C. Hagen, and H. Ozkaptan.
Oct 66, 64p OR-8528
Contract N00014-66-C0150

Descriptors: (*Target acquisition, *Military training), Terrain, Television display systems, Training films, Training devices, Effectiveness, Performance (Human), Operators (Personnel).

A study was conducted to assess the value of training in perspective geometry on a subject's ability to locate target areas. Perspective geometry is defined as the study of spatial relationships on the ground and how they change when viewed from an oblique angle by means of a television system under simulated dynamic flight conditions. Simulation was accomplished by filming actual terrain from 2000 feet with a 28 degree field-of-view camera and projecting through a closed circuit TV system. (Author)

AD-640 763 **Field 5I, 1C, 5C**
Not available from CFSTI.
Royal Canadian Air Force, Ottawa (Ontario).
MILITARY/CONTRACTOR RELATIONSHIPS IN AIRCRAFT DEVELOPMENT PROGRAMS: LESSONS FROM HISTORY,
by W. H. Casley. 25 Jan 66, 8p
Availability: Published in Canadian Aeronautics and Space Journal v12 n4 p129-35 Apr 1966.

Descriptors: (*Aircraft industry, *Personnel management), Military personnel, Civilian personnel, Motivation, Canada, Military requirements, History.

Identifiers: Contractors.

The paper deals with the historical relationships which have existed between the military and contractors in the development of aircraft. It is shown that the majority of successful British military aircraft used in World War II owed much to contractor initiative, and that few of the very successful machines evolved as the result of strict adherence to military specifications. The paper then deals with present day relationships and concludes that factors such as the cost of modern aircraft, the rate of technological change, and the weapons system concept all tend to militate against company initiative and to force the contractor into closer relationships with the military. The paper concludes with some thoughts on strengthening relationships and suggests that great care should be taken in selecting military officers who participate in aircraft development programs, and that professionals on both sides must foster a harmonious relationship through personal contacts and the use of professional societies and groups. (Author)

AD-640 814 **Field 5I, 5J, 5G**
CFSTI Prices: HC$3.00 MF$0.50
Human Sciences Research Inc., McLean, Va.
THE UTILIZATION OF FOREIGN LANGUAGES IN NAVAL PSYCHOLOGICAL OPERATIONS,
by Gerald C. Bailey. Sep 64, 56p HSR-RR-66/9As
Contract Nonr-4346 (00)
Previously issued as HSR-TN-64/1As, Sep 64, as AD-606 995.

Descriptors: (*Language, *Naval training), (*Mlitary psychology, Language), Performance (Human), Effectiveness, Social communication, Verbal behavior.

A study of foreign languages in Naval psychological operations was performed with the purpose of beginning to define research problems in the areas of training and operational utilization. Currently, about 1,000 officers and enlisted personnel are annually receiving at least some foreign language training. An analysis of the decisions made in the administration of this training revealed that information about the use of languages in missions was not being systematically employed because such knowledge does not generally exist. An obstacle to the development of this information is the view that skill in a foreign language is a tool in mission performance. The basic approach used to begin to develop an understanding of the rela-

tion of languages to missions was through an examination of the function which language usage serves for the foreign national. These functions help identify criteria for planning and evaluating missions and suggest new missions. Analysis of the functions which language training serve for the user, together with other mission analyses, help define criteria for training which prepares him for more effective performance in foreign cultures. Foreign languages need to be defined more broadly as an aspect of cross-cultural communication in which verbal skills are but one subset of a variety of interaction skills which involve attitude change and social influence processes, status attribution and motivation. (Author)

AD-640 827 **Field 5I, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
PROGRAM OPERATE: MANUAL FOR USE OF COMPUTER IN ENLISTED CLASSIFICATION PROJECT COMPASS, PART VI.
Technical bulletin,
by Bruce R. Wood, Carl C. Schuster, and John D. Martin. Oct 66, 53p STB-67-7
Proj. PF016050201
See also AD-636 540.

Descriptors: (*Naval personnel, Classification), (*Programming (Computers), Personnel management), Computers, Selection, Naval training.

Identifiers: Operate program, COMPASS project.

The report describes the operation and use of Program OPERATE, the sixth part of Project COMPASS, a Computer Assisted Classification and Assignment System. Program OPERATE and its necessary accompaning parts are FORTRAN Computer programs and subroutines. Program OPERATE selects and assigns to a naval recruit, if possible, a naval school. Selection is done by means of a modified version of the transportation algorithm applied to test battery scores. The program then punches out an assignment card. It is to be used in conjunction with Program LOCNEC, Technical Bulletin STB 66-32, which completes the assignment process by assigning a Navy Enlisted Classification Code, a calendar week code, and a school location code. (Author)

AD-640 873 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
RELATIVE EFFECTIVENESS OF COLOR AND BLACK AND WHITE IN INSTRUCTIONAL FILMS,
by A. W. VanderMeer. Jun 52, 25p
Contract N6onr-269 (07)
SPECDEVCEN-269-7-28

Descriptors: (*Training films, Effectiveness), Color film, Learning, Retention, Human engineering, Costs.

Six hundred and ninety-nine students were given training by films; half saw color films and half saw identical films in black and white. Tests were given to discover differences in the learning of the two groups. Ratings on a like-dislike scale were made by the students to discover their preferences for color or black and white films. Results showed that (1) both films produced learning; (2) there was no greater learning from the color films; (3) information presented in the color films was remembered longer; (4) color films were liked better than black and white films; and (5) subject content had a greater effect on the liking for a film than the effect of black and white or color. It was recommended that training films should be produced in black and white because the increased cost of color film is not offset by increased learning.

AD-640 874 **Field 5I**
CFSTI Prices: HC$1.60 MF$0.50
Pennsylvania State Univ., University Park.
DAYLIGHT PROJECTION OF FILM LOOPS AS THE TEACHING MEDIUM IN PERCEPTUAL-MOTOR SKILL TRAINING,
by J. A. Murnin, W. Hayes, and S. F. Harby. May 52, 11p
Contract N6onr-269 (07)
SPECDEVCEN-269-7-26

Descriptors: (*Training films, Effectiveness), (*Teaching methods, Training films), Instructors, Learning.

A study was made to determine whether film demonstrations are as effective as a live demonstration in teaching a skill. Loops of film demonstrating tumbling skills were projected in the lighted gymnasium for the film-taught groups. Instructor-taught groups were taught by an experienced gymnastic instructor using conventional teaching methods. From the testing of seventy-nine students who were taught the skills it was found that: (1) film-taught groups learned skills without an experienced instructor. (2) live instruction was superior to film instruction. The advantage can be attributed to coaching (See SDC 269-7-25). (3) using film loops instructors with a minimum amount of training and experience can teach skills effectively. The findings of this research confirm previous indications that film demonstrations of a skill are as effective as a live instructor's demonstration.

AD-640 875 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
FILM PROFILES (RAPID MASS LEARNING).
Technical rept.,
by Loran Twyford. Nov 51, 20p
Contract N6onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-23

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films), Tests, Correlation techniques.

The purpose of the experiment was to determine whether a subjective rating profile of this kind would correlate highly enough with a profile based on objectively tested learning so that it could be considered as a reliable measure of the learning which would result from the successive sections or intervals of an instructional film. The three kinds of rating profiles investigated were based on the following methods of responding: (1) 'I am learning from the film.' (2) 'I predict that my classmates are learning from the film.' (3) 'I like-dislike the film.'

AD-640 876 **Field 5I**
CFSTI Prices: HC$1.60 MF$0.50
Pennsylvania State Univ., University Park.
THE VALUE OF NOTE-TAKING DURING FILM LEARNING (RAPID MASS LEARNING).
Technical rept.,
by Philip Ash, and Bruce J. Carlton. Nov 51, 13p
Contract N5onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-21

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films), Tests.

The experiment was conducted to learn the value of taking notes while viewing an instructional film. The study was performed by testing four groups of college freshmen to determine how well they mastered the content of two films under different conditions of note-taking. Test data for 216 students showed the following results: (1) Taking notes while watching the film resulted in reduced test scores. (2) Review of the notes before taking the test resulted in slight gains over note-taking without review. (3) The highest test scores were made by the groups that watched the films without taking notes. The principal implication of this study is that taking notes while watching an instructional film seems to interfere with learning from the film. Related studies have shown that only when the film develops very slowly, with pauses and repetitions, can students improve their learning by some participation exercise.

AD-640 877 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
EVALUATION OF A PROCEDURE FOR USING DAYLIGHT PROJECTION OF FILM LOOPS IN TEACHING SKILLS.
Human engineering rept.,
by S. F. Harby. May 52, 14p
Contract N6onr-269 (07)
SPECDEVCEN-269-7-25

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films), Instructors, Tests.

From the results of testing 100 men it was found that (1) film demonstrations projected by means of film loops in daylight proved as effective as a live instructor's demonstration, (2) demonstrations interspersed with practice were not more effective, (3) coaching of the individual during practice was significantly superior to no coaching, (4) daylight projection of film loops is a practical way of providing on-the-spot film demonstrations in perceptual-motor training.

AD-640 878 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
COMPARISON OF MENTAL PRACTICE AND PHYSICAL PRACTICE IN THE LEARNING OF PHYSICAL SKILLS.
Technical rept.,
by S. F. Harby. Jun 52, 14p
Contract N6onr-269 (07)
SPECDEVCEN-269-7-27

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films), Motor reactions.

The purpose of this study was to determine whether students can learn a physical skill simply by watching a motion picture and by 'mentally going through the motions' of the skill as they see it demonstrated on the screen. 'Mental' and physical practice to net a basketball were compared to answer this question. Results showed that (1) mental practice was found to be effective in teaching a skill. (2) Twenty periods of mental practice was comparable to fourteen periods of physical practice. (3) A combination of mental practice and physical practice would be most effective in teaching a skill.

AD-640 879 **Field 5I**
CFSTI Prices: HC$1.60 MF$0.50
Pennsylvania State Univ., University Park.
RELATIONSHIP OF ANXIETY TO LEARNING FROM FILMS,
by Sarah G. Allison, and Philip Ash. Apr 51, 18p
Contract N6onr-269 (07)
SPECDEVCEN-269-7-24

Descriptors: (*Training films, Effectiveness), (*Learning, Motivation), (*Teaching methods, Training films), Anxiety.

Four hundred and eighty students were tested to determine how well they learned from films under various degrees of motivation to learn. One group of students was given instructions to decrease motivation to learn, a second group was given neutral instructions, and a third group was given motivational instructions. The use of mildly motivational instructions consistently resulted in higher scores on the test of film content. Positive motivation gave better results than negative motivation.

AD-640 880 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.

RELATIONSHIP OF LENGTH AND FACT FREQUENCY TO EFFECTIVENESS OF INSTRUCTIONAL MOTION PICTURES.
Technical rept.,
by W. S. Vincent, P. Ash, and L. P. Greenhill.
Nov 49, 16p
Contract N6onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-7

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films), Recall, Retention.

The purpose of this research was to determine the effect on learning of varying (1) the total amount of factual information presented in a film of a given length, and (2) the length of time allotted to conveying a fixed amount of information. The question is: Does increasing the concentration of facts in a film result in a proportionate increase in learning. Four experimental films on aerology were shown. The Long Heavy version ran 29 minutes and contained 224 facts; the Long Light version also ran 29 minutes but contained 112 facts. The Short Heavy version ran 14 minutes and contained 112 facts; the Short Light version ran 14 minutes but contained 56 facts. Results indicated that significant learning occurred. Every group which saw an experimental film earned a substantially higher score than the control group which did not see a film. The best version in an all-around sense on the basis of total score differed from population to population. For the High School sample the Short Heavy version seemed to be the most effective, for the Air Force and College samples the Long Light version seemed to be most effective.

AD-640 881 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
THE EFFECTS OF PRESTIGE AND IDENTIFICATION FACTORS ON ATTITUDE RESTRUCTURING AND LEARNING FROM SOUND FILMS.
Technical rept.,
by John P. Kishler. Mar 50, 13p
Contract N6onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-10

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Attitudes, Learning), Motion pictures, Teaching methods.

The results of this study are interpreted to lend support to the proposition that established attitudes towards a film's protagonist and theme are factors of importance to be considered in the learning process. This study suggests that it is possible to make a differential predication of learning from a motion picture by means of measures of attitudes toward characteristics of the main character which serve as indices of the potentiality for identification with the main character. The study also suggests that knowledge of an intended audience's identifications with (positive attitudes toward) persons and groups, can give major clues concerning the characteristics that should be exhibited by the main character of a motion picture in order to facilitate learning of the information and acceptance of the ideas presented in the motion picture. (Author)

AD-640 882 **Field 5I**
CFSTI Prices: HC$3.00 MF$0.50
Pennsylvania State Univ., University Park.
RELATIVE EFFECTIVENESS OF INSTRUCTION BY: FILMS EXCLUSIVELY, FILMS PLUS STUDY GUIDES, AND STANDARD LECTURE METHODS (RAPID MASS LEARNING).
Technical rept.,
by Abram W. VanderMeer. Jul 50, 53p
Contract N6onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-13

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films), Motivation, Instructors.

The study was undertaken to determine whether and to what extent instructional films can carry the entire teaching burden, in a course involving the teaching of a body of factual information. The overall results suggest that a body of factual information such as high school general science, may be taught by films alone, almost as effectively as by a teacher using conventional classroom methods (except films), and by films introduced and supplemented by brief study guides perhaps a little more effectively than by conventional non-film teaching methods.

AD-640 883 **Field 5I**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park.
THE CLASSROOM COMMUNICATOR (RAPID MASS LEARNING).
Technical rept.,
by C. R. Carpenter, R. C. Eggleton, F. T. John, and J. B. Cannon Jr. Oct 50, 33p
Contract N6onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-14

Descriptors: (*Teaching machines, Effectiveness), (*Teaching methods, Teaching machines), Design, Learning.

A report is presented of the planning, design and construction of experimental equipment appropriate for research on the learning process and the evaluation of complex instructional and informational programs. The Classroom Communicator makes possible the administration of multiple-choice objective tests, or attitude scales, in such a way that the results are available directly after the conclusion of the test. In addition, the instructor or experimenter can see immediately how each individual responds to each item in the test. Other features of the system will make possible new kinds of experimentation in the learning process. The pre-design functional requirements for the equipment are given in detail. The equipment which has been designed and constructed to meet these requirements is described and illustrated. An explanation is given of how the components of the Classroom Communicator operate.

AD-640 884 **Field 5I, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
THE EFFECTS OF MENTAL HYGIENE FILMS ON SELF-REGARDING ATTITUDES. (RAPID MASS LEARNING).
Technical rept.,
by Marjorie S. Mertens. Jul 51, 15p
Contract N6onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-22

Descriptors: (*Training films, Effectiveness), (*Motion pictures, Adjustment (Psychology)), Personality, Psychometrics, Attitudes, Perception (Psychology), Teaching methods, Learning.

The objective of this study was to learn whether or not a series of mental hygiene films could be used to effect changes in self-regarding attitudes and consequently effect improvement in an individual's personal adjustment. It was concluded that selected films can have some influence on an individual's perception of himself and may effect changes in the way he regards himself. Films are probably effective to the extent that they treat problems similar to those faced by the individual, and to the extent that the problems are shown to evolve out of situations closely similar to those which have been experienced by the individual himself.

AD-640 885 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
CONTRIBUTIONS OF FILM INTRODUCTIONS AND FILM SUMMARIES TO LEARNING FROM INSTRUCTIONAL FILMS.
Technical rept.,
by C. W. Lathrop Jr. and C. A. Norford. Nov 49, 25p
Contract N6onr-269 (07)
Projs. NR-781-005, 20-E-4
SPECDEVCEN-269-7-8

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films).

The exploratory survey has opened up a number of problems relating to the effectiveness of various kinds of introductory and concluding sequences in films. For the films studied the introductions and summaries made small positive contributions to learning, with one exception. This exception, in which the introduction produced an adverse effect on learning, underlines the need for further experimental work to determine what kinds of introductory and concluding sequences will be most useful in promoting learning from films. (Author)

AD-640 886 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
EFFECTS OF FILM-VIEWING PRACTICE ON LEARNING FROM INSTRUCTIONAL FILMS (RAPID MASS LEARNING).
Technical rept.,
by A. W. VanderMeer. Nov 51, 15p
Contract N6onr-269 (07)
Proj. NR-781-005
SPECDEVCEN-269-7-20

Descriptors: (*Training films, Effectiveness), (*Learning, Training films), (*Teaching methods, Training films), Statistical analysis.

A study was undertaken to determine whether experience or practice in learning from films increases efficiency in learning from films. The results of the experiment showed that the two groups previously taught by one of the two film methods were consistently superior to the one group taught by the conventional teaching method (no films); the learning increment resulting from the four additional films was greater for the two films groups than for the conventional methods group. In one-half of twenty comparisons made between film groups and the conventional methods group, differences in favor of the film groups were statistically significant. In the remaining ten comparisons, differences favored the groups with the previous film viewing experience in all but two cases, but were not statistically significant.

AD-641 182 **Field 5I**
CFSTI Prices: HC$2.00 MF$0.50
Naval Training Device Center, Port Washington, N. Y.
RESEARCH AND DEVELOPMENT OF A SIMULATED DOSIMETER (FOR USE IN CONJUNCTION WITH LARGE AREA RADIAC TRAINER, DEVICE 11F6).
Technical rept.,
by Michael R. Leibowitz. Sep 66, 35p
NAVTRADEVCEN-1H-61
Proj. A-11-66

Descriptors: (*Dosimeters, Simulators), (*Training devices, Dosimeters), Electrometers.

The simulated dosimeter must resemble and perform like the actual Dosimeter (1M-93/UD) except that its motivation must be radio waves rather than radioactivity. The approach taken was to modify the actual 1M-93/UD dosimeter by bringing a conduction lead to the inner charged foil. The charge was bled off through the plate of an electrometer tube, the bleed off being controlled by grid bias. An electrometer tube had to be used since other types of tubes allowed too much spurious conduction. Observations are given on phenomenon in the picoampere range. (Author)

PB-170 823 **Field 5I, 5J, 12A**
CFSTI Prices: HC$10.60 MF$0.75
Naval School of Aviation Medicine, Pensacola, Fla.
SIMPLEX THEORY,
by Marshall B. Jones. 1 Jun 59, 108p Monograph-3, SAM-P-13
AD-232 508

Descriptors: (*Correlation techniques, *Training), Theory, Learning, Transfer of training, Factor analysis, Naval training.

Identifiers: Simplex.

Contents: Molar correlational analysis, Simplex and simplicial form, The string model, and How to do it.

PB-173 447 **Field 5I**
CFSTI Prices: HC$3.00 MF$0.75
Lehigh Univ., Bethlehem, Pa.
INFORMATION MANAGEMENT IN ENGINEERING EDUCATION,
by Robert S. Taylor. Aug 66, 76p
Proceedings and Recommendation of the Conference on Information Sources, Systems and Media in Engineering Education held at Lehigh Univ., May 19-20, 1966.

Descriptors: (*Engineering, *Education), Symposia, Engineering personnel, Scientific research, Information retrieval, Universities.

The purpose of the conference was to determine the feasibility and dimensions of a long-range program directed toward the encouragement of the use of information media, systems, and resources in engineering education. The approach proposed as the basis for the conference assumed that professional attitudes and habits are in good part built in engineering schools. Consequently it was felt that, to achieve success, attention must be focussed on tomorrow's engineer, i.e. today's student, from undergraduate through continuing education programs. To accomplish this, it is felt necessary to work through the engineering faculties. The program proposed at the conference would undertake to encourage the introduction into existing engineering curricula of problems which would stimulate and train students (a) to make use of existing information media; (b) to develop an awareness of the role in engineering practice of information derived from the permanent record, informal communication, and experimentation; and (c) to develop the habit of using information in its variety of channels as a daily working tool of his profession. (Author)

AD-127 495 **See Field 17B**

AD-143 738 **See Field 17B**

AD-441 248 **See Field 9C**

AD-640 541 **See Field 6D**

AD-640 649 **See Field 22B**

AD-641 129 **See Field 5K**

AD-75348 **See Field 17B**

AD-95 052 **See Field 17B**

5J. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-640 561 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Louisville Univ., Ky. Dept. of Psychology and Social Anthropology.
CATEGORY CLUSTERING: A 'PLAN' FOR CATEGORY RETRIEVAL IN FREE RECALL.
Technical rept.,
by John A. Robinson. 15 Jul 66, 16p TR-1
Grant AF-AFOSR-1008-66
AFOSR-66-1828

Descriptors: (*Recall, Analysis), Psychometrics, Classification, Reasoning.

Identifiers: Clustering (Psychology).

A thirty-item categorizeable word list was presented five times to 68 Ss with a three minute written recall period following each list presentation. The recall protocols were evaluated for evidence of category clustering (CC). Two measures of CC were developed: a category clustering index, and the number of intertrial category-pair repetitions. Substantial CC was obtained and was found to be significantly related to category recall. Further analyses suggested that (1) the amount of CC reflects limits of the memory store, (2) CC precedes word clustering, and (3) the degree of intercategory organization developed by S regulates the amount of intracategory organization he attains in recall. CC was characterized as constituting a 'plan' for category retrieval. (Author)

AD-640 562 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
North Dakota State Univ., Fargo.
RESOLUTION OF THE COMMUNICATION DISCREPANCY ISSUE IN ATTITUDE CHANGE,
by James O. Whittaker. Apr 66, 24p
Grant AF-AFOSR-62-188
Proj. AF-9779
Task 977902
AFOSR-66-2050
Prepared for presentation at the Annual Meeting of the Eastern Psychological Association, New York, 1966.

Descriptors: (*Attitudes, *Social psychology), Social communication, Perception (Psychology).

Identifiers: Cognitive dissonance.

A controversial issue in the area of attitude change revolves around the question of whether greater discrepancies between communication position and attitude of the subject yield greater or lesser change. Recent research has tended to demonstrate that there is a curvilinear relationship between attitude change and the degree of communication discrepancy. Small differences yield negligible positive attitude change. Moderate differences yield the greatest change; and large discrepancies are believed to be responsible for negative change or 'boomerang effects.' The optimal discrepancy yielding greatest change is dependent upon the subject's latitude of acceptance' for deviant positions. If the latitude of acceptance is small, only very slight discrepancies yield positive change. If it is large, the optimal discrepancy may be much further away from the position of the subject. (Author)

AD-640 568 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Duke Univ., Durham, N. C.
THE USE OF MULTIVARIATE REGRESSION USING DUMMY VARIABLES IN SOCIAL-PSYCHOLOGICAL EXPERIMENTS.
Technical rept.,
by Kurt W. Back, and H. H. Winsborough. Sep 66, 24p TR-22
Contract Nonr-1181 (11)
Proj. NR-177-470
Prepared for presentation at the Annual Meetings of the American Psychological Association, Chicago, Illinois, September, 1965.

Descriptors: (*Psychometrics, Statistical tests), Social psychology, Analysis of variance, Correlation techniques, Personality, Motivation.

Multiple regression analysis using dummy variables makes regression techniques possible in experimental designs instead of analysis of variance. These techniques have been applied previously to demographic data, but not to psychological experiments. Dummy variables are created by 'scoring' individuals according to the presence or absence of a dichotomous trait, e.g., '1' or '0' for being in an experimental group or not. Several categories are dealt with by creating n-1 dummy variables leaving one category with a zero value on all dummy variables. In a multidimensional design, dummy variables are created for each dimension, combinations of dimensions. No assumption is necessary in regression analysis about variables underlying the qualitative categories. Dummy variables can be combined in the regression equation with continuous variables or other dummy variables representing background or previous experimental treatment. In this case the slope of the regressions of the dependent variables on the continuous variable can not be significantly different in the separate sectors of the population defined by the dummy variables, that is, no analysis of covariance problem should exist. (Author)

AD-640 569 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Duke Univ., Durham, N. C.
BUFFER CONDITIONS IN EXPERIMENTAL STRESS.
Technical rept.,
by Kurt W. Back, and Morton D. Bogdonoff. Sep 66, 16p TR-21
Contracts Nonr-1181 (11), PHS-M-5356
Proj. NR-177-470
Supported in part by contract PHS-MH-10896.

Descriptors: (*Stress (Psychology), Psychophysiology), Fatty acids, Behavior, Social psychology, Leadership, Motivation.

Identifiers: Conformity.

Reactions of subjects to the experimental situation was investigated by means of plasma free fatty acid level. Arousal (elevated FFA level) was shown at entry into the experiment, at the giving of instructions, and at upsetting experiences during the experiment. Stress at entry can be called experimental stress, variations within the experiment, manipulated stress. A series of conditions which insulate the subject socially, psychologically or physically from the situation diminish experimental stress and obliterate the differences in manipulated stress. They are: previous acquaintance, previous work together as a group, commitment to the experiment, and low height-weight ratio. (Author)

AD-640 581 **Field 5J**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
UNBIASED HYPOTHESIS TESTS FOR FREE-RECALL VERBAL LEARNING.
Technical rept.,
by Michael Woodroofe. 29 Aug 66, 28p TR-119
Contract Nonr-225 (52)
Proj. NR-342-022

Descriptors: (*Learning, Verbal behavior), (*Recall, Psychometrics), Statistical analysis, Probability.

In 1952 Miller and McGill proposed a model for free recall verbal learning which describes a subject by three parameters, a initial probability of recall p, a learning rate parameter gamma, and a learning asymptote lambda. (See also Bush and Mosteller (1955) for a discussion of this model.) Ten years later Lorge and Solomon (1962) used the Miller-McGill model to study the relation between group performance and the performance of the individuals which comprise the group. During the course of their investigation (Lorge and Solomon (1962)), a question arose as to the significance of differences between some estimated group gamma's and products of the estimated individual gamma's. The present paper is essentially an outgrowth of this question. (Author)

AD-640 624 **Field 5J**
Not available from CFSTI.
American Institutes for Research, Pittsburgh, Pa. Team Training Lab.
A REINFORCEMENT ANALYSIS OF GROUP PERFORMANCE,
by Robert Glaser, and David J. Klaus. 7 Jul 65, 25p
Contract Nonr-2551 (00)
Availability: Published in Psychological Monographs: General and Applied v80 n13 23p 1966.

Descriptors: (*Group dynamics, *Behavior), Performance (Human), Learning, Social psychology.

Identifiers: Reinforcement (Psychology).

Two studies investigated response feedback and reinforcement contingencies occurring in a 'team environment.' Study I investigated 3-man series teams under conditions of response acquisition, extinction, spontaneous recovery, reacquisition and reextinction. Feedback to team members was based solely on group output. The results suggest team performance can be manipulated using methods which effectively control the behavior of individual organisms. Study II investigated 3-man parallel teams in which a reinforced team response could occur as a function of correct responding by only part of the team. With continued reinforced practice, performance degraded to a level equal to or below initial team performances. These findings are analyzed in terms of an operant conditioning model of team performance. (Author)

AD-640 650 **Field 5J**
CFSTI Prices: HC$3.00 MF$0.75
System Development Corp., Santa Monica, Calif.
SELECTIVE CHANGES IN THE PRESENTATION OF RANDOM SHAPES AS A DETERMINANT OF JUDGED COMPLEXITY.
Professional paper,
by Charles P. Allen. 1 Jul 66, 58p SP-2566/000/00

Descriptors: (*Geometric forms, *Visual perception), Visual signals, Analysis of variance.

The paper reports on a study conducted to determine the effects on judged complexity which result from selected changes in the number and range of complexity levels associated with a series of randomly derived stimulus shapes. Human subjects were required to judge the complexity of a series of tachistoscopically presented stimulus shapes, where judgements followed the presentation of a sample or anchor stimulus. The results show that judged complexity can be significantly effected by (1) a change in the number of complexity levels presented; (2) the complexity of the initial stimuli presented in a series of stimulus presentations (findings indicated an inverse correlation between the constructed complexity of sample stimuli and the judged complexity of subsequent stimuli); and (3) the constructed complexity of the stimulus being judged. Results also indicated that complexity level interaction may function as an identifiable factor which effects complexity judgements. Finally, the results suggest that variables shown to contribute to judgements of complexity constitute an aggregate, where each member of the aggregate must incorporate appropriate weighting factors in order to improve the reliability of predictions concerning complexity judgements. (Author)

AD-640 698 **Field 5J**
Not available from CFSTI.
Gustavus Adolphus Coll., St. Peter, Minn.
CONSISTENCY OF INDIVIDUAL DIFFERENCES IN PERSUASIBILITY,
by James O. Whittaker. 1965, 11p
Grant AF-AFOSR-62-188
Proj. AF-9779
Task 977902
AFOSR-66-1161
Availability: Published in Journal of Communication v15 n1 p28-34 Mar 1965.

Descriptors: (*Decision making, Social communication), Personality, Analysis of variance.

Identifiers: Persuasion (Psychology), Persuasive communications.

Previous research has demonstrated the existence of a generalized trait of persuasibility. Some individuals are found to be highly susceptible to persuasive influences, regardless of the issues involved, while others are found to be highly resistant. Unfortunately, however, within most of the studies demonstrating this trait, only one medium of communication has been employed. Some investigators, for example, have used only mass communications, while others have investigated persuasibility solely in direct interpersonal communication situations. On the basis of this previous work, it has been clearly demonstrated that persuasibility as a generalized trait is 'medium-free.' In other words, it is not known whether those individuals found to be generally susceptible to mass communication influences are also generally susceptible to interpersonal influences, or vice versa. In the study, susceptibility to autokinetic situation, and the results showed a significant relationship. The study is an attempt to extend this work through a comparison of persuasibility in an interpersonal situation. (Author)

AD-640 699 **Field 5J**
Not available from CFSTI.
North Dakota State Univ., Fargo. Dept. of Psychology.
SEX DIFFERENCES AND SUSCEPTIBILITY TO INTERPERSONAL PERSUASION,
by James O. Whittaker. 8 Oct 63, 7p
Grant AF-AFOSR-62-188
Proj. AF-9779
Task 977902
AFOSR-66-1162
Availability: Published in The Journal of Social Psychology v66 p91-4 1965.

Descriptors: (*Social communication, Attitudes), Sex, Social psychology, Perception (Psychology), Males, Females, Public opinion, Culture.

Identifiers: Persuasive communications.

Previous studies have found female subjects to be significantly more persuasible than males in mass communication situations. In addition, the present investigation has observed that female subjects in the autokinetic situation appear to be more susceptible to the influence of a confederate's judgments than do male subjects. In that study, however, another hypothesis was under investigation, and conditions were such that no definite conclusions in this regard could be reached. This investigation was conducted to determine if there are sex differences in susceptibility to interpersonal persuasive influences. The hypothesis was that female subjects will show greater susceptibility to the influence of a confederate's judgments in the autokinetic situation than will male subjects. Also under investigation in this study is the effect of the sex of the confederate as a variable in persuasion. In this connection it was hypothesized that a male confederate will exert greater persuasive influence over both male and female subjects than will a female confederate. (Author)

AD-640 704 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Medical Research Inst., Bethesda, Md.
OBSERVER-MODEL SIMILARITY IN THE CONTAGION OF AGGRESSION,
by Ladd Wheeler, and Lewis Levine. 1966, 19p
NAVMED-MF022.01.03-1002

Descriptors: (*Behavior, Group dynamics), Motivation, Psychometrics.

Identifiers: Aggression.

Each subject engaged in a 'discussion' with two tape recorded confederates. The 1st confederate expressed opinions designed to anger the subject; the 2nd confederate (the model) then aggressed against the 1st confederate. Prior to the 'discussion,' the subject had been made to feel very similar in background to the model or very dissimilar. Results: subjects who observed a dissimilar model aggressed more toward the instigating confederate than did subjects who were paired with a similar model. Attitude toward the dissimilar model changed radically as a result of the 'discussion.'

AD-640 720 **Field 5J**
Not available from CFSTI.
Naval Medical Research Inst., Bethesda, Md.
RESTRAINTS AGAINST IMITATION AND THEIR REDUCTION,
by Ladd Wheeler. 15 Nov 65, 16p
Grant DRB-9465-11
NAVMED-MF022.01.03-1002-17
Availability: Published in Journal of Experimental Social Psychology v2 n3 p288-300 July 1966.

Descriptors: (*Decision making, Group dynamics), (*Group dynamics, Motivation), Behavior, Analysis.

Two separate experiments tested the hypothesis: To the extent that judgmental agreement among others appears subsequent to the subject's judgment on each trial of an ambiguous task involving no feedback, the subject will, over trials, imitate whomever he can. This prediction was based on two assumptions: (a) The subject is motivated to imitate others in order to generate presumptive evidence of the accuracy or adequacy of his performance. (b) The subject is likely to feel restraints against imitating others during the course of an experiment. Both studies confirm the experimental hypothesis and provide independent support for its two generative assumptions. Restraint reduction, afforded by the subject's observing the imitative behavior of others, is suggested as the process mediating this effect. (Author)

AD-640 784 **Field 5J**
Not available from CFSTI.
Ohio State Univ. Research Foundation, Columbus.
INTERNAL VERSUS EXTERNAL CONTROL OF REINFORCEMENT AND DECISION TIME,
by Julian B. Rotter, and Ray C. Mulry. 26 Mar 64, 9p
Contract AF 49 (638)-741
Proj. AF-9778
Task 977802
AFOSR-66-1151
Availability: Published in Journal of Personality and Social Psychology v2 n4 p598-604 1965.

Descriptors: (*Perception (Psychology), Control), Decision making, Time, Analysis, Psychometrics.

Identifiers: Reinforcement (Psychology).

Previous research has shown generality of individual differences in an expectancy that reinforcement is contingent on one's own behavior (internal control) versus an expectancy that reinforcement is determined by luck, chance, fate or powerful others (external control). The hypothesis was investigated that 'internals' and 'externals' differ in the value placed on the same reward depending upon whether it is perceived as contingent upon chance or skill. To test this, decision time was measured in a difficult matching task, and described to 1/2 the Ss as skill, and to 1/2 as chance determined. Results show significant interaction between internal-external control and chance vs. skill instructions. As hypothesized, internals take longer with skill instructions, externals with chance instructions. The study extends the construct validity of the internal-external control variable and has implications for personality, cultural differences, and decision theory. (Author)

AD-640 793 **Field 5J**
Not available from CFSTI.
Tufts Univ., Medford, Mass. Inst. for Psychological Research.
INTERMANUAL TRANSFER OF COMPENSATION FOR DISPLACED VISION,
by Ronald E. Kalil, and Sanford J. Freedman. Jun 65, 6p
Contract AF 49 (638)-1282, Grant PHS-RD-1688-P
Proj. AF-9778
Task 977801
AFOSR-66-1146
Availability: Published in Perceptual and Motor Skills v22 p123-6 1966.

Descriptors: (*Vision, *Psychomotor tests), Motor reactions, Afterimages, Visual perception, Proprioception.

Nine male college students participated in two training sessions and in one experimental session. A modified Held-Gottlieb box (1958) was used for testing hand-eye coordination before and after each exposure. While wearing displacing prisms, each S viewed one hand as he reached for and touched a target in the mid-saggital plane. After exposure, significant compensation was measured with the contralateral hand. (Author)

AD-640 795 **Field 5J**
Not available from CFSTI.
Tufts Univ., Medford, Mass. Inst. for Psychological Research.
PERSISTENCE OF OCULAR ROTATION FOLLOWING COMPENSATION FOR DISPLACED VISION,
by Ronald E. Kalil, and Sanford J. Freedman. 15 Nov 65, 7p
Contract AF 49 (638)-1282, Grant PHS-RD-1688-P
Proj. AF-9778
Task 977801
AFOSR-66-1163
Availability: Published in Perceptual and Motor Skills, v22 p135-9 1962.

Descriptors: (*Vision, *Proprioception), (*Eye, Rotation), Prisms (Optics), Motor reactions, Psychomotor tests.

Photographic measurements of eye position before and after compensation for prismatic visual displacement revealed significant and persistent lateral ocular rotations of which Ss seemed unaware. These rotations could account for errors in reaching when prisms are first worn as well as for aftereffect errors. (Author)

AD-640 846 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
State Univ. of New York, Buffalo.
LEADER STYLE, COMPETENCE, AND SOURCE OF AUTHORITY AS DETERMINANTS OF ACTUAL AND PERCEIVED INFLUENCE.
Technical rept.,
by Edwin P. Hollander, James W. Julian, and Franklyn A. Perry. Sep 66, 20p TR-5
Contract Nonr-4679 (00)
Proj. NR-177-269

Descriptors: (*Leadership, Perception (Psychology)), Group dynamics, Personality, Psychometrics.

Three characteristics of group leaders were manipulated experimentally to determine their impact on group member acceptance of leader influence. Leaders were perceived: as either self-oriented or group-oriented in their actions; as relatively competent or incompetent at the task; and were either elected by group members or appointed by a source external to the group. Leaders perceived as more competent at the task were significantly more influential than were leaders perceived to be less competent. Leaders who were seen as self-oriented in their distribution of rewards were seen as unfair in their treatment of the group, but they were not less influential than group-oriented leaders in determining group member task judgments. While source of leader authority was not by itself significant in producing leader influence, it did produce significant differential consequences on the relationship between actual and perceived influence, with election yielding a positive and significantly stronger correlation between the two influence measures than did appointment. Thus, influence achieved by the leader was clearly shown to be a function of his perceived characteristics. (Author)

AD-640 850 **Field 5J, 6P**
Not available from CFSTI.
Hearing and Communication Lab., Indiana Univ., Bloomington.
MASKING-LEVEL DIFFERENCES AS A FUNCTION OF INTERAURAL DISPARITIES IN INTENSITY OF SIGNAL AND OF NOISE.
by James P. Egan. Dec 65, 9p
Grant AF-AFOSR-548-66
Proj. 9769
Task 976903
AFOSR-66-1341
Prepared for presentation at the Meeting of the Acoustical Society of America (68th), 21-24 Oct 1964, Austin, Tex.
Availability: Published in The Journal of Acoustical Society of America v38 n6 p1043-9 Dec 65.

Descriptors: (*Auditory signals, Noise), Hearing, Audiometry, Intensity, Audiofrequency, Ear, Psychometrics.

Identifiers: Masking (Perception).

A marked release from masking, or masking-level difference (MLD), results when a monaural signal is presented with perfectly correlated (in-phase) binaural noise, NO--Sm, rather than with monaural noise, Nm--Sm. Furthermore, with NO--SO, when the sinusoid in one ear is reduced in intensity, rather than being removed entirely, a smaller MLD than for NO--Sm should result. Two experiments were conducted. In the first, MLD's were determined as a function of the intensity of the noise in the nonsignal ear with the interaural conditions of NO, N pi, and NU as parameters. For NO, there is some release from masking even when the noise in the nonsignal ear is as much as 40 dB down from that in the signal ear. In the second experiment, MLD's were determined as a function of the ratio of the energies of the left- and right-ear sinusoids with correlated noise, NO. With SO, MLD's increase as the interaural disparity in intensity of the signal increases. The large MLD obtained with S pi decreases with increasing interaural disparity in intensity of the signal. In both experiments, the signal (500 cps, 0.25 sec) was presented to the listener in one or the other of two temporal intervals, against a background of white noise. (Author)

AD-640 913 **Field 5J**
Not available from CFSTI.
Antioch Coll., Yellow Springs, Ohio. Behavior Research Lab.
ATTENTION AND DISCRIMINATION: A BEHAVIORAL ANALYSIS,
by Harry J. Jerison. 1966, 6p
Grant AF-AFOSR-150-66
Proj. AF-9778
Task 977801
AFOSR-66-1166
Prepared for presentation at the International Congress of Psychology (18th) 1966, Moscow, USSR. Symposium on: Orienting Reflex, Arousal, and Attention.
Availability: Published in Proceedings of International Congress of Psychology (18th), Moscow 1966.

Descriptors: (*Attention, *Target discrimination), Behavior, Decision making, Conditioned reflex, Learning, Decision theory, Humans, Monkeys.

In discrimination experiments, signals may be presented only occasionally during prolonged vigils. Some signals are sufficiently strong to be detected every time by an attentive subject, yet too weak to attract the attention of the inattentive subject. Detections or conditioned responses to such signals can, therefore, be used to indicate attentiveness. The following experimental results are considered in this report: (1) During long vigils, some signals are always missed. (2) Monkeys trained to avoid shocks by responding when a signal appears may stop attending to the signal and make many free responses ('false alarms') when the shock is made sufficiently strong. (3) Human observers make more false alarms during prolonged vigils than would be predicted from a mathematical analysis of signal detectability. The shift from attentiveness to free responding described under (2) above is a 'decision' with respect to the task which has the effect of minimizing overall costs for the animal. A sufficient explanation for Result (3), derived from decision-theory, is that observers are sometimes only partially attentive, and then nonsignal stimuli will be more frequently confused with signals. Other results presented in the report show that monkeys become attentive when it is important to become attentive and they form patterns of behavior that are best understood as the temporal conditioning of attentiveness. The results as a whole, which are partly interpretable in terms of the conditioning of observing responses, also demand decision-theory approaches to attention. (Author)

AD-640 925 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
THE ACCURACY OF COUNTING REPEATED SHORT TONES,
by W. R. Garner. 22 Jan 51, 7p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-122
Availability: Published in Journal of Experimental Psychology v41 n p310-6 Apr 1951.

Descriptors: (*Auditory acuity, Errors), Sound, Frequency, Time, Counting methods, Psychoacoustics.

The purpose of these experiments was to determine the accuracy with which the number of short tones in a series could be counted as a function of the repetition rate of the tones and the total number of tones in the series. Rates of 4, 6, 8, 10, and 12 per second were used, with numbers from 1 to 20. Tone durations of 5 and 40 msec., and intensities of 55 and 95 db. SPL were also used. The major conclusions are: (1) The accuracy of counting is a function of both number of tones and the repetition rates. Very low numbers can be accurately counted at repetition rates as high as 12 per second. At numbers above five or six, however, counting accuracy decreases with rates of 6 or more per second. (2) The decrease in accuracy is accompanied by a consistent tendency to underestimate the number of tones in the series and by an increase in the variability of the reported numbers. (3) Tone intensity and duration have no effect on accuracy of counting. (4) Randomizing the repetition rate between each successive presentation has a statistically significant but practically unimportant effect on counting accuracy. (Author)

AD-640 939 **Field 5J**
Not available from CFSTI.
Princeton Univ., N. J. Dept. of Psychology.
INDIVIDUAL DIFFERENCES IN PERFORMANCE OF A DISCRIMINATION TASK,
by Elijah Lovejoy, Myron B. Manley, and Mymon Goldstein. 15 Nov 65, 7p
Grant AF-AFOSR-965-65
Proj. AF-9778
Task 977801
AFOSR-66-1148
Prepared in cooperation with Massachusetts Univ., Amherst, and Pennsylvania Univ., Philadelphia.
Availability: Published in Perceptual and Motor Skills v22 p195-9 1966.

Descriptors: (*Problem solving, Psychometrics), Performance (Human), Perception (Psychology), Learning, Vocabulary, Children, Factor analysis.

Fifth-grade children performed a four-display discrimination task in which reinforcement depended on the positions of two stimulus alternatives and the identities of extra stimuli not offered for choice. There were 84 Ss, of whom only 33 solved the task. Results for solvers and nonsolvers were correlated separately with seven reference measures obtained from school records. A factor analysis was then performed on the data for solvers. The most important outcome was a factor determined principally by a vocabulary measure and the discrimination task of interest. (Author)

AD-640 940 **Field 5J**
Not available from CFSTI.
Princeton Univ., N. J.
LEARNING SET WITH INTRA-PROBLEM STIMULUS VARIATION,
by Mymon Goldstein, and Robert J. Weber. 14 Oct 65, 9p
Grant AF-AFOSR-965-65
Proj. AF-9778
Task 977801
AFOSR-66-1164
Availability: Published in Perpetual and Motor Skills v21 p799-805 1965.

Descriptors: (*Learning, Analysis of variance), Reaction (Psychology).

Thirty-six discrimination problems of a new type were presented to teen-age human Ss. Each problem contained four trials, and each trial involved a choice between a constant and varied stimulus. The constant stimulus appeared on all trials within a problem. The varied stimulus was different on every trial. There were six experimental groups, representing orthogonal combination of a three-treatment reinforcement variable and a two-treatment response vs nonresponse variable. The reinforcement variable involved the following treatments, listed in ascending order of difficulty: constant stimulus correct on all problems, varied stimulus correct on all problems, constant and varied stimuli correct alternately over problems. The response vs nonresponse variable was applied only to Trial 1, and its effects were evaluated on later trials, which showed that the nonresponse treatment was more difficult. (Author)

AD-641 007 **Field 5J**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
TRIAL SPACING IN INSTRUMENTAL RUNNING,
by James L. Fozard. 1966, 9p JA-2751
Contract AF 19 (628)-5167, Grant PHS-M-2288
ESD-TR-66-386
Prepared in cooperation with Lehigh Univ., Bethlehem, Pa.
Availability: Published in Psychological Reports v18 p623-30 1966.

Descriptors: (*Learning, *Conditioned reflex), Behavior, Statistical analysis, Rats.

Trial spacing was studied over 120 acquisition trials and 20 each of extinction, reacquisition, and re-extinction, using five intertrial intervals from 40 sec. to 120 min. in between four daily trials. Throughout acquisition, performance of the 120-min. group increased throughout the course of a daily block, while the others first increased, then decreased. Spontaneous regression persisted throughout acquisition. Extinction performance was not systematically related to trial spacing, and no evidence for spontaneous recovery was found. Changes in measured spatial variability in the alley indexed learning but did not differentiate trial spacing effects. The results generally failed to confirm qualitative hypotheses about trial spacing derived from statistical learning theory. (Author)

AD-641 101 **Field 5J**
Not available from CFSTI.
Illinois Univ., Urbana. Dept. of Psychology.
SMALL GROUP RESEARCH: A SYNTHESIS AND CRITIQUE OF THE FIELD,
by Joseph E. McGrath, and Irwin Altman. 1966. 609p
Contract AF 49 (638)-1291
Proj. 9779
Task 977902
AFOSR-66-2247
Prepared in cooperation with Naval Medical Research Inst., Bethesda, Md.
Availability: Hard copy available from Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York, N. Y. 10017.

Descriptors: (*Group dynamics, Scientific research), Social psychology, Classification, Culture, Bibliographies.

CONTENTS: Classification of small group research information: a case study; the classification system: a validation of the classification system: evaluation, modifications, and implications of the classification system: perspectives on the small group field; descriptive characteristics of the small group field; generalizations from small group research data; methodology of small group research: problems and prospects; the culture of the small group research field; catalogue of relationships, annotations, and bibliography with addenda.

AD-641 117 **Field 5J**
CFSTI Prices: HC$4.00 MF$0.75
Illinois Univ., Urbana. Coordinated Science Lab.
A PARADIGM FOR THE INVESTIGATION OF ANTECEDENT PROCESSES IN CONCEPT ATTAINMENT,
by Steven Henry Schwartz. Sep 66, 102p Rept. no. R-321
Contracts DA-28-043-AMC-00073 (E), Nonr-3985 (08)
Proj. DA-20014501B31F

Descriptors: (*Perception (Psychology), Psychometrics), Classification, Word association, Reasoning, Performance (Human), Behavior, Decision making.

The purposes of the study were: (1) To examine the utility of the proposed schema for investigating behavior in concept attainment tasks by: (a) Determining the strength of the theoretical hypotheses relating the five stipulated constructs (magnitude, and scope of relations over conditions). (b) Determining the locus of effect of various independent variables (known to affect terminal performance) on the above response variables encompassed by the theoretical hypotheses. (c) Determining the locus of effect of numerous subject-determined variables (such as content--total population of instances, and sequence--order in which instances are tested) on the response variables encompassed by the theoretical hypotheses. (d) Determining the temporal and sequential orderings in behavior involving these constructs prior to attainment of the concept. (2) To explore other interesting relations manifest in the data that have not as yet been incorporated within a formal theory. (3) To compare the theory with other models at points where there exist common terms. (Author)

AD-641 190 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Indiana Univ., Bloomington.
INTERACTIVE CLASSIFICATION: A METHOD FOR ASSESSING THE ADEQUACY OF COUNTERBALANCING AS A MEANS OF CONTROL.
Technical rept.,
by John J. Furedy. Oct 66, 25p TR-14
Contract Nonr-908 (15)

Descriptors: (*Test construction (Psychology), Control), (*Psychometrics, Experimental design), Conditioned reflex, Factor analysis, Statistical tests, Classification.

In situations where a treatment is varied over the same Ss in order that each S may serve as his own control, and where an associated source of variation is controlled for by counterbalancing between Ss, the success of this method of control depends on the absence of interaction between the treatments and the counterbalanced factor. When the data are classified into a factorial system involving the treatments and t e counterbalanced factor as the two classifications, it is difficult to find a statistical model to test such an interaction. A strategy, by means of which established statistical models can be used to evaluate this interaction, is presented here, and its range of application is discussed. (Author)

AD-641 251 **Field 5J**
CFSTI Prices: HC$3.00 MF$0.75
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EFFECTIVE TECHNICAL COMMUNICATIONS MECHANICAL DESCRIPTION-EXPERIMENT III.
Technical rept.,
by Richard M. Davis. 1966, 91p
AFIT-TR-66-15
See also AD-631 238.

Descriptors: (*Reading, English language), (*Learning, Reading), Factor analysis, Test methods, Social communication, Teaching machines, Effectiveness.

Identifiers: Technical writing.

The effects of three variables on the effectiveness of a written technical communication were tested in a 3x2x2 factorial experiment. The subject matter was a description of a simple mechanism. The variables were (1) the manner in which the size and shape of the machine were presented (drawings alone, drawings with verbal description, verbal description alone), (2) introduction (present or absent), and (3) internal orienting material (present or absent). The effectiveness of the message was measured by (1) comprehension, (2) reading time, (3) the reader's impression of the author's knowledge of the subject matter, and (4) the reader's impression of the author's competence as a writer. The two audiences tested were (1) 186 very bright men with known technical interests who had been instructed in technical writing and (2) 112 very bright men with known technical interests who had not been instructed in technical writing. The twelve versions of the reading passage were assigned to the subjects in each audience on a random basis. Each subject read his passage, recorded his reading time, completed the comprehension test, and made the two judgments.

AD-641 258 **Field 5J**
Not available from CFSTI.
Naval Medical Research Inst., Bethesda, Md.
STIMULATION SEEKING DURING SENSORY DEPRIVATION,
by Seward Smith, and Thomas I. Myers. 1966, 29p
Availability: Published in Perceptual and Motor Skills p1-29.

Descriptors: (*Sensory deprivation, Reaction (Psychology)), Stimulation, Confinement (Psychology), Perception (Psychology), Behavior, Psychophysiology, Stress (Psychology), Sensation (Physiology), Personality, Analysis of variance.

Identifiers: Reinforcement (Psychology).

Thirty-six volunteer Naval enlisted men underwent isolation for 48 hours during a study of conditions of 'relaxation'. Each S spent 24 hours alone in dark quiet sensory deprivation (SD), and 24 hours in a control condition (C) providing a virtual stimulus cafeteria. The amount of time S listened to a boring stock market report during one hour each day was used as an index of stimulation seeking need. Significantly more listening occurred while Ss were in the SD as compared with the C condition. Stimulation seeking results were com-

pared with various pre-isolation predictor tests, during-isolation criterion measures and with post-isolation reports of isolation symptomatology. (Author)

AD-641 288 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Medical Research Inst., Bethesda, Md.
ALONE TOGETHER,
by W. W. Haythorn, and I. Altman. 1966, 17p
NAVMED-MR002.01-03-1002

Descriptors: (*Confined environments, Stress (Psychology)), (*Personality, Confinement (Psychology)), (*Adjustment (Psychology), Confinement (Psychology)), Behavior, Performance (Human), Group dynamics.

A study was made to determine what happens when pairs of men are locked together around the clock that would not happen if they were merely fellow workers or roommates who went their own ways at night. Eighteen pairs of men--young sailors in boot training--were selected to meet certain conditions of compatibility, in order to determine how much of the stress of isolation could be relieved by properly matching personalities. They were tested and rated in four personality dimensions: need for achievement; need for dominance; need for affiliation; need for dogmatism. They were then matched in such a way that in one-third of the pairs both men were high in each of these dimensions, in one-third both were low, and in the final third one was high and one low. The control group, composed of similar pairs, followed the same work schedule in identical, confined rooms, but were not confined around the clock. The study demonstrates clearly that the stresses of isolation are considerably affected by the relations between personality types. Good adjustment may decrease or modify stress in constructive ways; bad adjustment may increase, exaggerate, or complicate it, sometimes in destructive ways.

N66-32287 **Field 5J**
CFSTI Prices HC$1.00 MF$0.50
California Univ., Los Angeles. Graduate School Of Business Administration.
FUNCTIONAL AMBIGUITY AND THE CUSHIONING OF ORGANIZATIONAL STRESS.
by F. Masarik. 1965, 19p NASA-CR-76698
Sponsored By Nasa

Descriptors: *Management, *Mental stress, *Psychological factor, Ambiguity, Behavior, Business, Clarity, Effectiveness, Factor, Function, Human, Optimal, Organization, Personnel, Psychology, Stress.

For abstract, see STAR 04 17.

N66-37564 **Field 5J**
CFSTI Prices HC$4.00 MF$0.75
Neurosciences Research Program, Brookline, Mass.
SLEEP, WAKEFULNESS, DREAMS AND MEMORY.
by W. P. Koella, and W. J. Nauta. 31 May 66, 107p
NASA-CR-78365
Grant NSG-462, Contract NIH GM-10211-04
Its Bull. V. 4, No. 1

Descriptors: *Central nervous system, *Sleep, *Wakefulness, Body, Brain, Cycle, Human, Mechanism, Nervous, Phenomenology, Physiology, Psychology, System.

For abstract, see STAR 04 22.

AD-101 548 **See Field 5I**

AD-109 245 **See Field 17B**

AD-191 **See Field 5I**

AD-221 573 **See Field 17B**

AD-244 814 **See Field 6S**

AD-42 860 **See Field 17B**

AD-464 326 **See Field 5E**

AD-640 814 **See Field 5I**

AD-640 884 **See Field 5I**

AD-641 057 **See Field 6P**

AD-641 129 **See Field 5K**

AD-641 285 **See Field 5K**

PB-170 823 **See Field 5I**

5K. SOCIOLOGY

AD-640 646 **Field 5K**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
DYNAMIC EVALUATION: THE SYSTEMS APPROACH TO ACTION-RESEARCH.
Professional paper,
by Alfred P. Parsell. 10 Aug 66, 24p SP-2423
Prepared for presentation to the Annual Meeting of the American Sociological Society (61st), Miami Beach, Fla., Sep 1, 1966.

Descriptors: (*Systems engineering, Sociology), Urban areas, Employment, Training, Problem solving, United States Government, Economics, Social sciences.

The evaluation problem accompanies the implementation and conduct of large-scale, complex and diffuse community action and intervention programs typified by the 'War on Proverty' programs of the Office of Economic Opportunity. Dynamic evaluation is an effort to place Action-Research in the theoretical framework of systems science and, thereby, provide it with logical justification, and effective set of tools and procedures, and an organization for the collection, analysis and feedback of relevant data and findings. In use, the systems approach in dynamic evaluation approaches social action programs as action systems and regards information as a necessary concomitant to effective action system functioning. The kind of information required, together with its sources, uses and flow, are defined by the system itself, which presupposes careful definition and analysis of that system and its components. The dynamic evaluation approach, in short, endeavors to comprehend the total action system, not as a static 'point-in-time' event, but rather as a continuous and changing process in which direction and control of the change are central. Systematic use of the process, through dynamic evaluation, may be expected to lead to greater theoretical relevance and sophistication in problem-solving design and to more efficient and effective action in practice. (Author)

AD-640 713 **Field 5K**
CFSTI Prices: HC$1.00 MF$0.50
Wildlife Management Inst., Washington, D. C.
SOCIAL STRUCTURE AND SHIFTING AGRICULTURE-THE WHITE MEO.
Technical rept. no. 1, Nov 65-Sep 66,
by George A. Binney. 30 Sep 66, 20p
Contract N00014-16-C0143

Descriptors: (*Anthropology, *Thailand), Sociology, Culture, Agriculture, Ecology, Economics, Law.

The study of a Meo Community in Thailand includes: (1) a brief formal structural analysis of ethnographic data; (2) a description of the ecological setting in which the community practices shifting agriculture; and (3) a discussion of land tenure as a regional problem. The White Meo (H'mong Deau) constitute a linguistic sub-group of the Meo peoples of the mountain provinces of South China. Large groups of Meo have migrated into Thailand, Laos, and Burma in search of a better environment, usually at elevations above 4,000 feet. The area discussed is a complex of White Meo villages in Chiengmai Province, Thailand. The community study village is Mae Nai. Staple crops are rice, corn, squash and pumpkins. Opium poppies are the traditional cash crop. Peaches introduced as recently as 1962 already have become a viable substitute for opium poppy. The Meo system of land tenure combines features of traditional Indonesian land law, tribal rights, and systems adapted from French, Dutch, and Japanese administration. The conception of the Meo of rights to land is similar to their conception of rights to water and air. Ownership of abandoned or uncultivated lands may be acquired by putting it to use. Rights of ownership can be transferred only with the approval of the tribe or village. This system sometimes has brought the Meo in conflict with government tax policies. Problems have arisen when a migratory, swidden community becomes a semi-permanent agricultural settlement. (Author)

AD-641 129 **Field 5K, 5I, 5J**
Not available from CFSTI.
Stanford Research Inst., Menlo Park, Calif.
PROFESSIONALIZATION,
by Howard M. Vollmer, and Donald L. Mills.
1966, 381p
Contract AF 49 (638)-1028
Proj. AF-9778
Task 977802
AFOSR-66-2248
Availability: Hard copy available from Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Descriptors: (*Social psychology, Professional personnel), (*Sociology, *Professional personnel), Medical personnel, Dental personnel, Medical technicians, Nurses, Political science, Law, Criminology, Motivation, Education, Engineering personnel, Personnel management, Instructors, Females, Public relations.

CONTENTS: The Concept of Professionalization; The Social Context of Professionalization; Individuals and Professionalization; Professional Controls; Professional Associations and Colleague Relations; Client and Public Relations; Relations Among Occupational Groups; Professionals and Complex Organizations; Professionals and the Government; Status Differences and Professionalization.

AD-641 181 **Field 5K**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A VIEW FROM MEGALOPOLIS,
by Paul Kecskemeti. Sep 66, 36p P-3460

Descriptors: (*Culture, Theory), Behavior, Humans, Social sciences, Language, Urban areas, Economics, Social psychology, Sociology, Religion, Leadership.

AD-641 285 **Field 5K, 5D, 5J**
Not available from CFSTI.
California Univ., Berkeley. Inst. of International Studies.
STRATEGIC INTERACTION AND CONFLICT: ORIGINAL PAPERS AND DISCUSSION,
by Morton Deutsch, John C. Harsanyi, Harold H. Kelley, Anatol Rapoport, and Thomas C. Schelling. 1964, 236p
Grant AF-AFOSR-227-64
Proj. AF-9779
Task 977902
AFOSR-66-2249
Availability: Publications Office, Inst. of International Studies, Univ. of California, Berkeley, 94720, at $2.25.

Descriptors: (*Social sciences, *Game theory), (*Behavior, Game theory), Social psychology, Decision making, Bargaining, Social communication, Attitudes, Political science, Symposia.

Contents: Some social-science implications of a

new approach to game theory; Bargaining, threat, and communication: some experimental studies; A classroom study of the dilemmas in interpersonal negotiations; Uncertainty, brinksmanship, and the game of 'chicken'; Strategic and non-strategic approaches to problems of security and peace; Discussion.

N66-31894 **Field 5K**
CFSTI Prices HC$3.25 MF$1.25
General Electric Co., Santa Barbara, Calif. Tempo Div.
APPLICATION OF AEROSPACE TECHNOLOGIES TO URBAN COMMUNITY PROBLEMS.
by M. L. Feldman, L. A. Gonzalez, and A. B. Nadel. 23 Sep 65, 185p NASA-CR-76524, RM-65TMP-53
NASA ORDER R-5177

Descriptors: *Aerospace technology, *Nasa program, *Sociology, Aerospace, City, Community, Ecology, Environment, Facility, Factor, Management, Matrix, Medical, Physical, Planning, Problem, Program, Psychology, Social factor, Solution, Technology, Waste.

For abstract, see STAR 04 17.

6A. BIOCHEMISTRY

AD-640 746 **Field 6A**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Dept. of Hematology.
ABSORPTION OF HEMOGLOBIN IRON BY THE RAT,
by Lewis R. Weintraub, Marcel E. Conard, and William H. Crosby. 1965, 4p
Availability: Published in Proceedings of Society for Experimental Biology and Medicine v120 p840-3 1965.

Descriptors: (*Hemoglobin, Absorption (Biological)), Diet, Iron, Salts, Iron compounds, Sulfates, Rats, Humans.

In the rat the absorption of a test dose of hemoglobin or hemin iron 59 was significantly less than a comparable dose of iron 59 as FeSO4. That this is of physiologic significance was demonstrated by producing a state of iron deficiency in animals raised on a diet with hemoglobin as the only source of iron. These findings are in contrast to recent observations in man and suggest a difference between species as well as a difference in the epithelial cells' ability to sequester iron as the salt or in the heme ring. (Author)

AD-640 910 **Field 6A, 6O, 6T**
Not available from CFSTI.
Defence Research Medical Labs., Toronto (Ontario).
A COMPARATIVE STUDY OF HYPERBARIC OXYGEN-INDUCED AND DRUG-INDUCED CONVULSIONS WITH PARTICULAR REFERENCE TO GAMMA-AMINOBUTYRIC ACID METABOLISM.
Research paper,
by J. D. Wood, W. J. Watson, and N. E. Stacey.
30 Aug 65, 11p DRML-RP-612
Availability: Published in Journal of Neurochemistry v13 p361-70 1966.

Descriptors: (*Oxygen, *Convulsive disorders), (*Drugs, Convulsive disorders), Metabolism, Fatty acids, Amino acids, Glycines, Glutamic acid, Toxicity, Neurology, CNS stimulants, Strychnos alkaloids, Pentylenetetrazol, Canada.

Identifiers: OHP, Thiosemicarbazide, Aminobutyric acids, Picrotoxin, Hydroxyl amines, Convulsant drugs.

Hyperbaric oxygen and thiosemicarbazide convulsions were similar to one another in several ways. The points of similarity were: (1) the long latent period, particularly at low doses, before convulsions occur; (2) the protective action of intraperitoneally administered gamma-aminobutyric acid (GABA) and glycine; (3) lack of effect on brain GABA-alpha-oxoglutaric acid transaminase activity; (4) inhibition of brain glutamic acid decarboxylase activity; and (5) decrease in brain GABA level; the last two changes occurring prior to the onset of seizures. None of the other convulsant agents tested caused a similar set of results. It is concluded that a deranged GABA metabolism may be a major cause of hyperbaric oxygen-induced and thiosemicarbazide-induced convulsions but that it is not a general cause of all types of seizures. (Author)

AD-640 911 **Field 6A, 7C**
Not available from CFSTI.
Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
SULFUR-CONTAINING AMINO ACIDS: CHROMATOGRAPHY ON CATION AND ANION EXCHANGE RESINS WITH AN AUTOMATIC ANALYZER,
by J. W. Purdie, J. P. Farant, and R. A. Gravelle.
21 Dec 65, 8p DCBRL-491
Availability: Published in Journal of Chromatography v23 p242-7 1966.

Descriptors: (*Organic sulfur compounds, Amino acids), (*Amino acids, *Chromatographic analysis), Ion exchange resins, Thiols, Sulfides, Instrumentation, Canada.

Some thiols and mixed disulfides related to cysteine were chromatographed on a cation-exchange resin and the results are reported. Separation of cysteine sulfinic acid, cysteic acid, alanine thiosulfonic acid, alanine thiosulfuric acid and other compounds of this type on Dowex 1 anion-exchange resin is described. (Author)

AD-641 142 **Field 6A**
Not available from CFSTI.
Brandeis Univ., Waltham, Mass. Graduate Dept. of Biochemistry.
CREATINE KINASE: EVIDENCE FOR A DIMERIC STRUCTURE,
by David M. Dawson, Hans M. Eppenberger, and N. O. Kaplan. 18 Oct 65, 10p Pub-388
Grants AF-AFOSR-732-65, PHS-CA-03611
Proj. AF-9777
Task 977701
AFOSR-66-1128
Prepared in cooperation with Neurological Unit, Boston City Hospital, Mass.
Availability: Published in Biochemical and Biophysical Research Communications v21 n4 p346-53 1965.

Descriptors: (*Phosphorus transferases, Molecular structure), Enzymes, Electrophoresis, Muscles, Brain.

The findings indicate that creatine kinase is an enzyme whose structure is that of a dimer, as suggested by Eppenberger et al (1964) and Thomson et al (1964). The muscle enzyme may be composed of two identical subunits (N-M), the brain enzyme of two identical but different subunits (B-B), and the hybrid molecule of two subunits, one of either kind (M-B). The hybrid enzyme, whether it occurs naturally or is formed in vitro, is intermediate in kinetic qualities and in electrophoretic mobility between the two parental or unmixed forms. Hence, the nature of the multiple forms of creatine kinase resembles that found with the lactic dehydrogenases in that a hybrid enzyme occurs in vivo (Cahn et al, 1962; Appella and Markert, 1961). (Author)

AD-641 183 **Field 6A**
Not available from CFSTI.
Brandeis Univ., Waltham, Mass. Graduate Dept. of Biochemistry.
REVERSIBLE INACTIVATION OF DEHYDROGENASES.
Interim rept.,
by Oscar P. Chilson, G. Barrie Kitto, Julio Pudles, and Nathan O. Kaplan. 15 Oct 65, 18p
Grants AF-AFOSR-732-65, PHS-CA-03611
Proj. AF-9777
Task 977701
AFOSR-66-1467
NSF-GB-1701.
Availability: Published in Journal of Biological Chemistry v241 n10 p2431-45 May 25 1966.

Descriptors: (*Oxidoreductases, Inhibition), Dissociation, Catalysis, Immunology, Salts, Peptides, Amides.

The reversible dissociation of lactic and malic dehydrogenases has been studied in detail and compared with the dissociation properties of triosephosphate dehydrogenase, alpha-glycerophosphate dehydrogenase, and liver alcohol dehydrogenase. Evidence is presented for the existence of an intermediate form of lactic dehydrogenase with catalytic properties altered during reactivation. The technique of reversible dissociation has been used to prepare interspecies hybrids of lactic, malic, and triosephosphate dehydrogenases. Some of the catalytic and immunological properties of hybrid malic dehydrogenases have been examined. The effects of salts on the reactivation of malic dehydrogenases have been investigated and related to previous results on lactic dehydrogenases. It is proposed that the observed salt effects may result from changes in the activity coefficients of the exposed peptide and amide groups. (Author)

AD-641 289 **Field 6A, 6P**
Not available from CFSTI.
University of Western Ontario, London. Dept. of Physiology.
PURIFICATION BY ULTRAFILTRATION OF A FAT-MOBILIZING SUBSTANCE EXTRACTED FROM THE URINE OF FASTING RATS,
by J. R. Beaton, A. J. Szlavko, and J. A. F. Stevenson. 10 Mar 66, 9p
Availability: Published in Canadian Journal of Physiology and Pharmacology v44 p701-9 1966.

Descriptors: (*Urine, *Fats), In vitro analysis, In vivo analysis, Proteins, Hypoglycemia, Rats, Fatty acids, Blood, Glucose, Dissociation, Purification.

A substance (FMS 1B) that mobilizes fat in vivo and in vitro can be extracted from the urine of fasting rats and other species. A threefold increase of lipolytic activity in vitro of rat FMS 1B was accomplished by ultrafiltration of an aqueous solution through regenerated cellulose tubing (pore size 24 A) under vacuum (10-15 mm mercury). This procedure removed a large proportion of the protein. Fat-mobilizing activity in vivo also appeared to be increased. Millipore filtration and carboxymethylcellulose treatment were without significant effect on the activity of FMS 1B. Sephadex G25 fractionation of the ultrafiltrate indicated three active fractions, the first of which was not associated with protein but coincided with the presence of a small amount of carbohydrate. None of the ultrafiltrate, the residue after ultrafiltration, or a mixture of the two showed evidence of the hypoglycemic property in vivo possessed by original FMS 1B. From these observations it is apparent that the fat-mobilizing activity of FMS 1B can be dissociated from protein material and from the hypoglycemic property. (Author)

N66-30022 **Field 6A, 6C**
CFSTI Prices HC$3.60 MF$0.50
Lund Univ. (Sweden). Dept. Of Zoology.
LOCALIZATION OF MONOAMINERGIC MECHANISMS FINAL REPORT.
by E. Dahl, and B. Falck. 25 Jan 66, 32p
AFOSR-66-0711, AD-632127
Contract AF-EOAR-64-5

Descriptors: *Amine, *Animal study, *Enzyme, *Nervous system, Animal, Biochemistry, Cell, Chemoreceptor, Electron, Estimation, Eye, Fish, Fluorescence, Histology, Localization, Mammal, Mechanism, Micros-

cope, Mollusk, Nervous, Pigeon, Precursor, Study, System.

For abstract, see STAR 04 17.

N66-30299 Field 6A
CFSTI Prices HC$3.00 MF$0.75
California Univ., Berkeley. Space Sciences Lab.
OCCURRENCE OF ISOPRENOID ALKANES IN A PRECAMBRIAN SEDIMENT.
by T. Belsky, A. L. Burlingame, M. Calvin, G. Eglinton, and W. Richter. 16 Mar 65, 67p NASA-CR-62300
Grant NSG-101-61
Its Ser. No. 6, Issue No. 9

Descriptors: *Alkane, *Hydrocarbon, *Sediment, Chromatography, Extraction, Gas, Infrared, Isolation, Leaf, Liquid, Mass, Oil, Precambrian, Seepage, Shale, Spectrum, Tobacco, Wax.

For abstract, see STAR 04 17.

N66-30588 Field 6A
CFSTI Prices HC$2.00 MF$0.50
Miami Univ., Coral Gables, Fla.
THE SYNTHESIS, RESOLUTION AND CONFIGURATION OF BETA-HYDROXYVALINE.
by K. Harada, and J.-I. Oh-hashi. 1966, 19p NASA-CR-76232
Grant NSG-689
Submitted For Publication Its Contrib. No. 054

Descriptors: *Amino acid, *Resolution, *Synthesis, Acid, Alpha, Amino, Benzyl, Chlorine, Compound, Configuration, Glycine, Hydrogenolysis, Hydrolysis, Hydrox, Methyl, Valine.

For abstract, see STAR 04 17.

N66-30589 Field 6A
CFSTI Prices HC$1.00 MF$0.50
Florida State Univ., Tallahassee.
THE CATALYTIC ACTIVITY OF THERMAL POLYANHYDRO-ALPHA-AMINO ACIDS FOR THE HYDROLYSIS OF RHO-NITROPHENYL ACETATE (CATALYSIS BY THERMAL POLYAMINO ACIDS).
by S. W. Fox, and D. L. Rohlfing. 1966, 18p NASA-CR-76240
Grant NSG-105-61, Contract NIH C-3971
Presented In Part At The 141st Meeting Of The Am. Chem. Soc., Washington, D. C., Mar. 1962
Submitted For Publication Its Contrib. No. 067

Descriptors: *Amino acid, *Catalytic activity, *Hydrolysis, *Nitro compound, Acetate, Acid, Activity, Alpha, Amino, Anhydride, Catalysis, Compound, Histadine, Nitro, Phenyl, Polymer, Rho, Thermal.

For abstract, see STAR 04 17.

N66-30590 Field 6A
CFSTI Prices HC$1.00 MF$0.50
Florida State Univ., Tallahassee.
THE INACTIVATION OF CATALYTICALLY ACTIVE THERMAL POLYANHYDRO-ALPHA-AMINO ACIDS. (INACTIVATION OF THERMAL POLYAMINO ACIDS).
by S. W. Fox, and D. L. Rohlfing. 1966, 24p NASA-CR-76241
Grant NSG-105-61, Contract NIH C-3971
Presented In Part At The 141st Meeting Of The Am. Chem. Soc., Washington, D. C., Mar. 1962
Submitted For Publication Its Contrib. No. 068

Descriptors: *Amino acid, *Catalytic activity, *Heating, Acetate, Acid, Activity, Alpha, Amino, Aspartic, Bond, Buffer, Catalysis, Chemistry, Histadine, Hydrolysis, Imide, Inactivation, Molecular, Nitro, Phenyl, Polymer, Solution, Thermal.

For abstract, see STAR 04 17.

N66-30616 Field 6A
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Dept. Of Biochemistry.
STRUCTURE AND FUNCTION OF PROTEINS AND NUCLEIC ACIDS SEMIANNUAL PROGRESS REPORT, 1 JAN. - 30 JUN. 1966.
by A. Kornberg, and L. Stryer. 1966, 12p NASA-CR-76222
Contract NGR-05-020-137

Descriptors: *Nucleic acid, *Planetary exploration, *Protein, Acid, Application, Biochemistry, Deoxyribonucleic acid (dna), Enzyme, Exploration, Factor, Finding, Fluorescence, Labelling, Macromolecule, Nucleic, Planetary, Potential, Proton, Reagent, Research, Resolution, Spectrum, Structure, Synthesis, Technique, Transfer, Transform.

For abstract, see STAR 04 17.

N66-30755 Field 6A
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Dept. Of Genetics.
DETECTION OF OPTICAL ACTIVITY AS A SIGN OF LIFE.
by J. W. Westley. Apr 66, 14p NASA-CR-76301, IRL-1047
Grant NSG-81

Descriptors: *Biophysics, *Gas chromatography, *Life science, Acid, Activity, Amino, Chromatography, Detection, Gas, Life, Liquid, Mass, Optical, Science, Soil, Spectrometry.

For abstract, see STAR 04 17.

N66-31234 Field 6A
CFSTI Prices HC$6.00 MF$1.50
Woods Hole Oceanographic Institution, Mass.
DATA FILE ON AMINO ACID DISTRIBUTION IN CALCIFIED AND UNCALCIFIED TISSUES OF SHELL- FORMING ORGANISMS.
by E. T. Degens, and D. W. Spencer. Jun 66, 250p NASA-CR-76381
Contracts NSR-22-014-001, PRF-1943-A2
Its Reference No. 66-27

Descriptors: *Amino acid, *Organism, *Quantitative analysis, *Shell, Acid, Amino, Analysis, Biology, Calcification, Computer, Digital, Environment, Formation, Invertebrate, Mollusk, Quantity, Tabulation, Tissue, Utilization.

For abstract, see STAR 04 17.

N66-37041 Field 6A
CFSTI Prices HC$2.50 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
FEASIBILITY STUDY FOR THE USE OF IOPHENOXIC ACID AS A REFERENCE MARKER FOR PLASMA PROTEINS FINAL REPORT.
by N. E. Kontaxis, and C. Mitoma. 25 Aug 66, 66p NASA-CR-73032
Contract NAS2-3072

Descriptors: *Acid, *Albumin, *Human, Association, Constant, Cow, Dialysis, Dog, Equilibrium, Experiment, Feasibility, Marker, Monkey, Plasma, Protein, Rabbit, Reference, Survival.

For abstract, see STAR 04 22.

N66-37311 Field 6A
CFSTI Prices HC$1.00 MF$0.50
Miami Univ., Coral Gables, Fla. Inst. Of Molecular Evolution.
CONDENSATION OF CYTIDYLIC ACID IN THE PRESENCE OF POLYPHOSPHORIC ACID.
by S. W. Fox, and A. W. Schwartz. 1966, 19p NASA-CR-78240
Grant NSG-689
Submitted For Publication Prepared In Cooperation With Fla. State Univ.

Descriptors: *Condensation, *Cytidylic acid, *Phosphoric acid, Biochemistry, Biophysics, Characterization, Chemical, Evolution, Hydrolysis, Linking, Molecular, Structure.

For abstract, see STAR 04 22.

AD-457 895 **See Field 6S**

AD-640 747 **See Field 6E**

AD-640 748 **See Field 6E**

AD-640 995 **See Field 6E**

6B. BIOENGINEERING

N66-30795 Field 6B
CFSTI Prices HC$1.00 MF$0.50
California Univ., Berkeley. Dept. Of Nutritional Sciences.
NUTRITIONAL REQUIREMENTS AND BREEDING BEHAVIOR OF PEROGNATHUS SEMIANNUAL PROGRESS REPORT, 1 JAN. - 30 JUN. 1966.
1966, 6p NASA-CR-76327
Contract NGR-05-003-118

Descriptors: *Nutritional requirement, *Pocket mouse, *Reproduction, Activity, Behavior, Breeding, Control, Diet, Environment, Food, Mouse, Nutrition, Pocket, Requirement, Sex.

For abstract, see STAR 04 17.

N66-31163 Field 6B
CFSTI Prices HC$3.00 MF$0.75
North American Aviation, Inc., Los Angeles, Calif.
DEVELOPMENT AND TESTING OF A PROTOTYPE RESPIRATION ANALYZER FINAL REPORT.
by J. W. Raeke, and D. M. Walton. 14 Dec 64, 81p NASA-CR-57209, NA-64-1298
Contract NAS4-367

Descriptors: *Analyzer, *Human, *In-flight monitoring, *Respiration, Carbon dioxide, Flow, In-flight, Mass, Meter, Method, Monitor, Oxygen, Pressure, Sensor, Temperature, Test.

For abstract, see STAR 04 17.

N66-31164 Field 6B
CFSTI Prices HC$3.00 MF$0.75
Autonetics, Anaheim, Calif. Research, Engineering, And Reliability Div.
THEORETICAL ASPECTS OF METAL-ELECTROLYTE INTERFACES FINAL REPORT.
by L. G. Bishop, and V. W. Bolie. 14 Sep 64, 66p NASA-CR-57211, C4-1472/3111
Contract NAS4-566

Descriptors: *Bioelectricity, *Electrochemical cell, *Electrodermal response, *Human, *Skin (biol), Biochemistry, Cell, Chloride, Copper, Electrochemical, Electrode, Electrodermal, Electrolysis, Galvanic, Potential, Response, Silver, Sulfate.

For abstract, see STAR 04 17.

N66-32630 Field 6B
CFSTI Prices HC$2.00 MF$0.50
Beckman Instruments, Inc., Fullerton, Calif. Advanced Technology Operations.
DESIGN, DEVELOPMENT, FABRICATION, TESTING AND DELIVERY OF FIVE (5) CARDIOVASCULAR REFLEX CONDITIONING SYSTEMS FINAL REPORT.
14 Mar 66, 44p NASA-CR-65435, FR-2408-101
Contract NAS9-5331

Descriptors: *Cardiovascular system, *Conditioned response, *Pneumatic equipment,

*Weightlessness, Apollo project, Astronaut, Cardiovascular, Conditioning, Control, Design, Equipment, Fabrication, Gemini project, Pneumatic, Reflex, Response, System.

For abstract, see STAR 04 17.

N66-37217 Field 6B
CFSTI Prices HC$3.00 MF$0.75
North American Aviation, Inc., Los Angeles, Calif.
PRELIMINARY ANALYSIS OF THE METABOLIC RATE MONITOR SYSTEM.
by R. K. Breeze, D. Byrnes, G. W. Campbell, and R. Tom. 1 Jul 65, 78p NAS-CR-78287, NA-65-513
Contract NAS4-876

Descriptors: *Monitor, *Oxygen consumption, *Respiration, Analysis, Analyzer, Blower, Breathing, Component, Consumption, Error, Evaluation, Flow, Human, Metabolism, Meter, Oxygen, Rate, System.

For abstract, see STAR 04 22.

6C. BIOLOGY

AD-412 453 Field 6C
CFSTI Price: HC$2.60
Edwards (William E.) Columbia, S. C.
STUDY OF MONKEY, APE AND HUMAN MORPHOLOGY AND PHYSIOLOGY RELATING TO STRENGTH AND ENDURANCE; PHASE II: FACTORS IN THE POSTURE AND GRASPING STRENGTH OF MONKEYS, APES, AND MAN.
Final rept.,
by William E. Edwards. Jul 63, 21p
Contract AF 29 (600)-3466
Proj. AF-6892
Task 689201
ARL-TDR-63-21

Descriptors: (*Primates, Strength), (*Posture, Primates), Morphology (Biology), Physiology, Humans, Anthropology, Muscles, Musculoskeletal system, Monkeys.

Maxium suspension time from a parallel rod for infant primates, including humans (155 seconds, two-handed), chimpanzees (5 minutes, one-handed), and rhesus monkeys (33 minutes, one-handed) approximately equals or exceeds that of adults of the same species, remarkably. Interspecific and interage differences are ascribable to geometrical similitude, because, with morphological pro portionality and physiological equivalence, larger animals are relatively weaker. Equally perplexing, the legs and feet of gibbons are proportionately less massive and architecturally more poorly constructed for supporting strength than those of great apes, yet gibbons walk erect with great frequency and duration; the same surprising contrast ists between immature and adult pongids. In both instances geometrical similitude is operative, with optimum form only partially compensating for the handicap of larger body-size. These analyses also provide the key to the interpretation of many other phenomena of primate form and function. (Author)

AD-640 631 Field 6C
CFSTI Prices: HC$1.00 MF$0.50
Max Planck-Institut fuer Verhaltensphysiologie Erling-Andechs (West Germany).
ENTRAINMENT OF CIRCADIAN RHYTHMS BY ZEITGEBERS.
Final scientific rept.,
by Juergen Aschoff. 25 Sep 66, 5p
Grant AF-EOAR-15-66
Proj. AF-9777
Task 977701
AFOSR-66-2251

Descriptors: (*Rhythm (Biology), Birds), Photoperiodism, Illumination, Stimulation, Mathematical models.

The results of five different types of experiments can be summarized as follows: (1) The phase-angle difference between the circadian rhythm and the entraining Zeitgeber is a function of the free-running circadian period as measured under constant conditions. (2) Circadian activity rhythms of birds, kept in konstant dim illumination, can be entrained by species-specific song cycles, demonstrating the existence of 'social Zeitgebers'. (3) The duration of twilight is one of the factors determining the phase-angle difference between the circadian rhythm and the entraining light-dark cycle. (4) Calculations with a model equation for circadian rhythms indicate that the duration of re-entrainment of a circadian rhythm after a phase-shift of the Zeitgeber depends (a) on the natural circadian period and (b) on the direction of the shift. (5) The theoretical predictions concerning the duration of re-entrainment after phase-shifts of the Zeitgeber have been confirmed in experiments with animals as well as with human subjects. (Author)

AD-640 667 Field 6C
Not available from CFSTI.
Army Medical Research Lab., Fort Knox, Ky.
THE LATERAL GENICULATE COMPLEX OF THE OWL MONKEY AOTES TRIVIRGATUS.
Doctoral thesis,
by Arthur E. Jones. 13 Jun 66, 17p Rept. no. 669
Proj. DA-3A014501B71P
Task 08
Research supported in part by NSF, Grant NSF-24125.
Availability: Published in The Journal of Comparative Neurology v126 n2 p171-9 Feb 66.

Descriptors: (*Monkeys, *Vision), Nervous system, Physiology, Anatomy, Retina, Color vision, Ganglia, Nerve cells, Brain, Histology.

The owl monkey is the only nocturnal monkey and possesses a pure rod retina. The lack of retinal cones and the apparent achromatic visual behavior of the animal suggest that any anatomical substrate of primate color vision in the higher visual centers should be missing in the owl monkey. The lateral geniculate nucleus of Aotes is composed of four lamina and the LGN of trichromatic Macaca six. The pregeniculate nucleus of Aotes is composed of two lamina and that of Macaca one. The nucleus intergeniculatus of Ateles (also a trichromatic species) and Macaca is a ventral extension of the pulvinar in Aotes. A 1:1 relationship between retinal ganglion cells and LGN cells is found in Aotes, but is probably not found in Macaca. (Author)

AD-640 671 Field 6C
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. School of Medicine.
STRIATE CORTEX CONNECTIONS IN THE MONKEY,
by Ronald E. Myers. 1962, 3p
Grant AF-AFOSR-61-38
Proj. AF-9777
Task 977701
AFOSR-66-1116
Availability: Published in Federation Proceedings v21 n2 Mar-Apr 1962.

Descriptors: (*Cerebral cortex, *Monkeys), Nervous system, Anatomy, Thalamus, Nerve fibers, Degradation.

Patterns of degeneration were studied in monkeys after removal of small extents of the striate cortex. The Nauta-Gygax technique demonstrated degenerating fibers streaming from the lesion areas through the white matter to distribute densely in cortex of neighboring sectors of area 19. Either no or extremely few fibers were found to pass into intervening area 18. Within area 17 itself degenerating fibers were found only in immediate relation to the lesions usually coursing horizontally within the granular layers without passing through the white matter. No degenerating fibers entered the corpus callosum nor did any distribute in the opposite hemisphere. Other contingents of fibers passed toward the brainstem to end in circumscribed areas of the lateral geniculate nucleus, the suprageniculate nucleus and the inferior and lateral subdivisions of the pulvinar. Other fibers coursed through the thalamus to end in restricted areas of the superior colliculus. A very few fibers passed into the zona incerta. (Author)

AD-640 719 Field 6C
Not available from CFSTI.
Naval Medical Research Inst., Bethesda, Md.
DEFINITION AND COLLECTION IN QUANTITY OF SCHISTOSOMULES OF SCHISTOSOMA MANSONI.
Interim rept.,
by Margaret A. Stirewalt, Danny R. Minnick, and Wilfred A. Fregeau. 1966, 12p
NAVMED-MR005.09.1031-01, NAVMED-MF022.03.07-1001-18
Availability: Published in Transactions of the Royal Society of Tropical Medicine and Hygiene v60 n3 p352-60 1966.

Descriptors: (*Schistosoma, Larvae), Morphology (Biology), Life cycle, Penetration, Membranes (Biology), Skin, Glands, Collecting methods.

On the basis of comparison of the characteristics of cercariae with schistosome larvae recovered from naturally-penetrated host skin in situ and cultured in vitro in Rose chambers with dialysis membranes, schistosomules are defined as saline- and serum-adapted, water-intolerant larvae developed from cercariae by casting of tails, depletion of pre- and post-acetabular glands, and changing of surface resulting in loss of precise cercarial shape and the capacity to form peri-cercarial sero-envelopes. The development of equipment and procedures is described for harvesting 15,000 or more schistosomules per collecting vessel, after they have penetrated dried, scraped, plucked rat abdominal skin. (Author)

AD-640 761 Field 6C
Not available from CFSTI.
Southern Illinois Univ., Carbondale. Dept. of Zoology.
MIDWAY'S DEADLY ANTENNAS,
by Harvey I. Fisher. 1966, 4p
Contract Nonr-3479 (00)
Availability: Published in Audubon Jul-Aug 1966.

Descriptors: (*Midway, Birds), (*Birds, Mortality rates), (*Antennas, Hazards), Reproduction (Physiology).

It is estimated that the world may lose one-sixth of its 1,500,000 Laysan albatrosses because of one small forest of antennas at Midway Atoll in the North Pacific. The most deadly parts of the antennal setup are the slanting cables supporting the 300-foot towers of the SCATTER communications apparatus, a radio relay system operated for the U. S. military forces on Eastern Island. The toll caused by the SCATTER system antennas began in the mid 1950's. Most of the albatrosses collide with the structures during high winds and rain, or when salt mist is blown high and driven inland from waves crashing on the coral reef or shore. Visibility is reduced then, and strong gusty winds make difficult the abrupt maneuvers necessary for the birds to dodge the wires. The effect of this single set of antennas, this one man-made mortality factor, on the experienced birds in the colony is to reduce the effective reproduction by two-thirds.

AD-640 789 Field 6C
Not available from CFSTI.
Stanford Research Inst., Menlo Park, Calif. Control Systems Lab.
SENSORY MODALITIES AND RECEPTIVE FIELDS IN THE ABDOMINAL NERVOUS SYSTEM OF THE HERMIT CRAB, PAGURUS GRANOSIMANUS (STIMPSON),
by William D. Chapple. 31 Aug 65, 18p
Contract AF 49 (638)-1112, Grant AF-AFOSR-334-63

Proj. AF-9777
Task 977701
AFOSR-66-1501
Availability: Published in Journal Experimental Biology v44 p209-23 1966.

Descriptors: (*Crustacea, Nervous system), (*Nervous system, Adaptation (Physiology)), Abdomen, Morphology (Biology), Ganglia, Nerve fibers, Histology, Electrophysiology, End organs, Muscles.

The morphology and histology of the abdominal nervous system is briefly described. There are three ganglionic roots, as in the crayfish; the first innervates the pleopods and the ventral lateral area of the segment, the second innervates the sclerite of the next posterior segment, and a region posterior and dorsal to it. The third roots are exclusively motor as in the crayfish and have two branches, one of which runs to the superficial ventral muscles and the other to the central flexors. Phasic fast-adapting mechano-receptors similar to those seen in annelids, with overlapping fields extending over much of the segment, have replaced the sensory hair population of the homologous roots in the crayfish. The units on the left side of the animal are more sensitive to mechanical stimuli than those on the right side; this is due to the fact that the right side lies next to the whorl of the shell while the left side faces away from it. Joint receptors are described, but no muscle receptor organs similar to those found in other decapods were observed.

AD-640 791 **Field 6C**
Not available from CFSTI.
Southern Illinois Univ., Carbondale. Dept. of Zoology.
BIRD RECORDS FROM MIDWAY ATOLL, PACIFIC OCEAN,
by Harvey I. Fisher. 19 Sep 64, 3p
Contract Nonr-3479 (00)
Availability: Published in The Condor v67 n4 p355-7 Jul/Aug 1965.

Descriptors: (*Midway, Birds), (*Birds, Mortality rates).

AD-640 794 **Field 6C**
Not available from CFSTI.
Southern Illinois Univ., Carbondale. Dept. of Zoology.
ELECTROPHORETIC STUDY OF BLOOD PROTEINS OF SOME PROCELLARIIFORM BIRDS,
by Lauren E. Brown, and Harvey I. Fisher. 1965, 7p
Contract Nonr-79 (00)
Availability: Published in The Auk v83 n1 p111-6 Feb 18 1966.

Descriptors: (*Birds, *Blood proteins), Electrophoresis, Genetics.

The blood proteins of 31 specimens of five species and one hybrid specimen of the order Procellariiformes were examined electrophoretically. The genera were well marked, and congeneric species exhibited the greatest similarities. The families Diomedeidae and Procellariidae did not show marked separation. Results of the study thus support the present systematic arrangement. The presence of prealbumins may be related to specific physiological conditions of the birds. (Author)

AD-640 896 **Field 6C**
Not available from CFSTI.
Naval Ordnance Test Station, China Lake, Calif.
HYDRODYNAMIC ANALYSIS OF CETACEAN PERFORMANCE.
Research rept.,
by Thomas G. Lang. 1966, 29p NOTS-TP-4176
Availability: Published in Whales, Dolphins, and Porpoises p410-32 1966.

Descriptors: (*Cetacea, Hydrodynamics), Analysis, Performance tests, Drag.

Identifiers: Dolphins.

(1) Results of performance tests with the dolphin Notty show no unusual physiological or hydrodynamic performance. The test conditions suggest, however, that hydrodynamic performance was adversely affected by one or more environmental factors. (2) Analysis of cetacean sightings and performance tests reported in the available references indicates that the drag of these animals is significantly lower than expected. Several low-drag hypotheses offer possible explanations. Additional, and more accurate, top-speed measurements are needed, preferably taken under natural oceanic conditions. (3) A brief analysis and summary of the available literature show that several types of free-riding behavior are exhibited by cetaceans. Different explanations for the bow-riding ability of dolphins exist, and the true explanation may be a combination of various explanations. (Author)

AD-640 902 **Field 6C, 9F**
Not available from CFSTI.
National Research Council of Canada, Ottawa (Ontario).
A MULTI-CHANNEL TRANSMITTER FOR THE PHYSIOLOGICAL STUDY OF BIRDS IN FLIGHT,
by O. Z. Roy, and J. S. Hart. 26 Nov 65, 14p
NRC-9147
Availability: Published in Med. and Biol. Engng. v4 p457-66 1966.

Descriptors: (*Birds, Flight), (*Telemeter systems, Physiology), Electrocardiography, Body temperature, Telemetering transmitters, Canada.

The paper describes a light-weight, rugged, multichannel transmitter designed for telemetering biological data such as tidal volume, electrocardiograms, and body temperature, from birds in flight. The transmitter operates at 230 Mc/s, and uses FM-FM modulation. It measures 3 in. in length, 1 in. dia. and weighs 30 g with two 100-mA hr Silvercel batteries. (Author)

AD-640 922 **Field 6C, 8A**
CFSTI Prices: HC$1.00 MF$0.50
National Academy of Sciences-National Research Council, Washington, D. C. Pacific Science Board.
BIOLOGICAL INVESTIGATIONS IN PACIFIC AREA,
by Harold J. Coolidge. Sep 66, 9p
Contract N7onr-291 (57)
Proj. NR-160-321

Descriptors: (*Pacific Ocean Islands, *Biology), Ecology, Rats, Fishes, Insects, Geography.

The program of Biological Investigations in the Pacific Area during the period of March 1955 to February 1966 sponsored a series of projects designed to increase the scientific knowledge of the biological sciences in the Pacific. These included a study of Pacific Island rats, studies of tropical fishes and their zoogeography, studies of Pacific insects, and identification of scientific collections. (Author)

AD-640 929 **Field 6C**
CFSTI Prices: HC$2.00 MF$0.50
Sao Paulo Univ. (Brazil). Biochemistry Lab.
THE CONTROL OF NUCLEIC ACID SYNTHESIS IN THE SALIVARY GLANDS OF RHYNCHOSCIARA ANGELAE.
Final rept. Aug 65-Jul 66,
by Francisco J. S. Lara. Aug 66, 27p
Grant DA-ARO-49-092-65-G84
Proj. DA-2N014501B71D-00-013-LA

Descriptors: (*Ribonucleic acids, Biosynthesis), (*Diptera, *Genetics), Salivary glands, Larvae, Desoxyribonucleic acids, Enzymes, Labeled substances, Brazil.

Methods were developed for extraction of RNA from salivary glands of Rhynchosciara, yielding high quality preparation as judged by hydrodinamic properties. By this method and pulse labeling the synthesis of RNA in the glands throughout larval development was studied. The principal class of RNA synthesized before the appearance of the large puffs is a 35S RNA. This RNA is subsequently transformed into ribosomal RNA. After appearance of the large puffs one observes almost complete inhibition of synthesis of ribosomal precursor. This correlation indicates the material produced in puffs is important in control of synthesis of RNA. (Author)

AD-640 938 **Field 6C**
Not available from CFSTI.
Cincinnati Univ., Ohio. Dept. of Zoology.
CILIA DEVELOPMENT AND ASSOCIATED PROTEIN SYNTHESIS IN THE SEA URCHIN EMBRYO,
by Walter Auclair, and Donald M. Meismer. 1965, 3p
Grants AF-AFOSR-964-65, PHS-CA-06439-03
Proj. AF-9777
Task 977701
AFOSR-66-0289
Availability: Published in Biological Bulletin v129 n2 p397 Oct 1965.

Descriptors: (*Echinodermata, *Embryology), (*Proteins, Biosynthesis), Cytology, Growth, Cells (Biology), Cell structure, Labeled substances, Antibiotics, Inhibition, Amino acids.

Identifiers: Actinomycins.

The development of cilia during the blastula stage of the sea urchin embryo is described. The synthesis of ciliary proteins is followed using C-14-labeled glutamic acid and leucine, and is found to be continuous throughout early development. The synthesis of these proteins is inhibited by actinomycin, an antibiotic that shuts off DNA-controlled RNA synthesis, although cilia still appear. It is concluded that normally there is continuous synthesis of ciliary proteins during early development for cilia formation, but it is not essential for the appearance of cilia. There is available in the cells of the embryo enough ciliary protein for the differentiation of cilia even if protein synthesis is stopped. (Author)

AD-641 147 **Field 6C**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. School of Medicine.
COMMISSURAL CONNECTIONS IN THE NEOCORTEX OF MONKEY,
by F. F. Ebner, and R. E. Myers. 1962, 3p
Grant AF-AFOSR-61-38
Proj. AF-9777
Task 977701
AFOSR-66-1117
Prepared for presentation at the International Congress of Physiological Sciences (22nd) Leiden, September 10-17, 1962.
Availability: Published in Excerpta Medica, International Congress Series No. 48 p1096 1962.

Descriptors: (*Brain, *Monkeys), Anatomy, Nerve fibers, Degradation.

Patterns of fiber degeneration were studied after transection of corpus callosum, anterior commissure and psalterium in monkey. Using the Nauta-Gyrax technique each lobe of the cerebrum was found to receive commissural fibers. The frontal lobe was distinguished by diffuse, relatively dense degeneration throughout the cortical areas. Small degeneration-free foci were found only on the medial and orbital surfaces, and buried in the central fissure. The parietal lobe exhibited richer contrasts with especially dense degeneration throughout inferior parietal gyrus (area 7) while degeneration-free zones characterized the hand and foot subdivisions of postcentral gyrus and dorsal and medial surfaces of superior parietal gyrus. The

temporal lobe was remarkable for the general paucity of degeneration. Only in cortex bordering the depths of superior temporal sulcus and in the cortex of more superior reaches of superior and inferior temporal gyri were more dense foci found. The occipital lobe was largely free of degeneration except for those regions approximately coextensive with cortical area 18. The insular cortex exhibited degenerating fibers in profusion in its posterior superior quadrant, in moderate numbers in its anterior superior quadrant, and in small numbers in its inferior quadrants. The cingulate gyrus received degenerating fibers mainly in its dorsal half. Anterior commissure fibers could be clearly traced into the region of inferior temporal convolution. (Author)

AD-641 278 **Field 6C, 9B**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
MANIPULATING DATES AND TIME LAPSES IN A COMPUTERIZED RECORDS SYSTEM,
by Harry M. Hughes. Sep 66, 17p SAM-TR-66-77
Proj. AF-6319
Task 631903

Descriptors: (*Biometry, Programming (Computers)), Information retrieval, Recording systems, Number theory, Data processing systems, Hospitals, Medical research.

A technic for handling dates within a computer as consecutive integers is defined and illustrated. Various possible applications are suggested, with an example demonstrating conversion in, conversion out, time between dates, number of weekdays between dates, and identification of a biweekly report date. (Author)

66-30341 **Field 6C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BIOLUMINESCENCE - A SELECTED BIBLIOGRAPHY FROM THE LITERATURE RETRIEVAL SYSTEM, SPACE BIOLOGY BRANCH.
Apr 66, 21p NASA-TM-X-55518, X-624-66-152

Descriptors: *Bacteria, *Bibliography, *Bioluminescence, *Organism, Culture (biol), Growth, Intensity, Light, Luminosity, Measurement.

For abstract, see STAR 04 17.

N66-30586 **Field 6C**
CFSTI Prices HC$1.00 MF$0.50
California Univ., Los Angeles. Dept. Of Physiology.
NON-PHOSPHORYLATING RESPIRATION OF MITOCHONDRIA FROM BROWN ADIPOSE TISSUE OF RATS.
by K. J. Hittelman, J. C. Roberts, and R. E. Smith. 1966, 13p NASA-CR-76215
Grant NSG-721, Contract PHS-G-HD-01826
Submitted For Publication

Descriptors: *Adipose tissue, *Mitochondria, *Phosphorylation, *Rat, *Respiration, Acclimatization, Adipose, Brown, Cold, Fat, Oxidation, Physiology, Tissue.

For abstract, see STAR 04 17.

N66-30764 **Field 6C**
CFSTI Prices HC$6.00 MF$1.25
Republic Aviation Corp., Farmingdale, N. Y.
STUDY OF THE FECAL BACTERIAL POPULATION OF CHIMPANZEES FINAL REPORT, OCT. 1964 - DEC. 1965.
by P. E. Riely. May 66, 230p NASA-CR-76265, ARL-TR-66-13
Contract NASA ORDER R-25, AF 29/600/-499

Descriptors: *Bacteria, *Chimpanzee, *Feces, *Human waste, Aerobe, Animal, Culture (biol), Human, Pathogenesis, Primate, Rectum, Sample, Streptococcus, Study, Table, Waste.

For abstract, see STAR 04 17.

N66-31806 **Field 6C**
CFSTI Prices HC$3.00 MF$1.00
National Aeronautics And Space Administration, Washington, D. C.
PROCEEDINGS OF THE EXPERIMENTERS' INFORMATION MEETING ON THE APOLLO APPLICATIONS PROGRAM IN BIOSCIENCE.
by D. R. Beem, and S. J. Gerathewohl. 1966, 137p NASA-TM-X-57742
Meeting Held In Washington, D. C., 22-23 Nov. 1965

Descriptors: *Apollo spacecraft, *Bioastronautics, *Experiment design, *Gemini project, *Nasa program, Animal, Application, Biology, Biosatellite, Cell, Conference, Design, Experiment, Frog, Gravity, Human, Life, Metabolism, Plant, Program, Project, Radiation, Science, Sea urchin, Space, Spacecraft, Weightlessness, Zero.

For abstract, see STAR 04 17.

N66-32117 **Field 6C**
CFSTI Prices HC$1.00 MF$0.50
Hollins Coll., Va.
THE RAT'S ANTICIPATION OF DIURNAL AND A-DIURNAL FEEDING.
by R. C. Bolles, and L. W. Stojkiewicz. 1963, 11p NASA-CR-60224
Grant NSG-396
Submitted For Publication

Descriptors: *Animal study, *Biological rhythm, *Diurnal variation, *Physiology, *Rat, Animal, Behavior, Biological, Clock, Diurnal, Feed, Psychology, Rhythm, Study, Variation.

For abstract, see STAR 04 17.

N66-32441 **Field 6C**
CFSTI Prices HC$1.00 MF$0.50
Naval Medical Research Inst., Bethesda, Md.
EXPERIMENTAL INVESTIGATION OF THE MECHANISM BY WHICH FREEZING OR DRYING AND ASSOCIATED EFFECTS AFFECT LIVING CELLS.
by H. T. Meryman. 14 Jun 66, 2p NASA-CR-76771, NMRI-022-JO
NASA ORDER R-63

Descriptors: *Biological cell, *Calorimetry, *Dehydration, *Freezing, *Histology, *Injury, Apparatus, Biology, Cell, Construction, Crystal, Design, Drying, Ice, Leukocyte, Platelet, Protection, Protozoa, Recording, Supercooling, Toxicity.

For abstract, see STAR 04 17.

N66-36444 **Field 6C**
CFSTI Prices HC$7.00 MF$1.75
New York Academy Of Sciences, N. Y.
MARINE BIOLOGY. VOLUME III - ECOLOGY OF INVERTEBRATES.
by W. T. Edmondson. 1966, 333p NASA-CR-77920
NASA ORDER R-144
Proc. Of The 3d Intern. Interdisciplinary Conf., Princeton, N. J., 19-22 Jan. 1964, Sponsored By The Am. Inst. Of Biol. Sci., Onr, And Aec

Descriptors: *Algae, *Ecology, *Food intake, *Hydrobiology, *Migration, *Plankton, *Sampling, Biology, Breeding, Diet, Food, Intake, Invertebrate, Marine, Nutrition, Ocean, Sea, Season, Symbiosis, Vertical.

For abstract, see STAR 04 22.

N66-36466 **Field 6C**
CFSTI Prices HC$8.27 MF$2.75
National Academy Of Sciences-national Research Council, Washington, D. C. Space Science Board.
BIOLOGY AND THE EXPLORATION OF MARS.
by J. P. Pearman, C. S. Pittendrigh, and W. Vishniac. 1966, 528p NASA-CR-77938
Contract NASR-239
Rept. Of Study Held At Stanford Univ. And New York, 1964 - Oct. 1965 Its Publ.-1296

Descriptors: *Biology, *Conference, *Extraterrestrial life, *Mars (planet), *Planetary exploration, Atmosphere, Biochemistry, Contamination, Detection, Ecology, Electron, Exobiology, Flyby, Information, Instrumentation, Landing, Life, Manned, Mission, Observation, Optics, Orbital, Remote, Retrieval, Soil, Spacecraft, Sterilization, Storage, Surface.

For abstract, see STAR 04 22.

N66-37283 **Field 6C**
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla. Naval Aerospace Medical Inst.
HISTOLOGICA STUDY OF SPONTANEOUS EAR INFECTIONS IN ALBINO RATS.
by M. Igarashi, and A. E. New. 20 May 66, 19p NASA-CR-78270, NAMI-967
NASA ORDER R-93
Joint Rept. With Nasa

Descriptors: *Histology, *Infection, *Rat, *Vestibular apparatus, Albino, Animal, Apparatus, Auditory, Bone, Ear, Membrane, Otolith, Spontaneous, Study, Vestibular.

For abstract, see STAR 04 22.

AD-458 366 **See Field 6S**

AD-469 585 **See Field 6P**

AD-640 831 **See Field 13B**

AD-640 870 **See Field 6S**

AD-640 951 **See Field 12A**

AD-641 018 **See Field 12A**

N66-30022 **See Field 6A**

6D. BIONICS

AD-640 541 **Field 6D, 5I**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
A MULTIPLE SEPARATION FUNCTION FOR PATTERN CLASSIFICATION,
by Kikumi Tatsuoka. Aug 66, 32p R-313
Contract DA-28-043-AMC-00073 (E)
Proj. DA-20014501B31F

Descriptors: (*Functional analysis, Pattern recognition), (*Pattern recognition, Classification), Artificial intelligence, Teaching machines, Programmed instruction, Topology.

Identifiers: PLATO teaching system.

This paper develops a method for classifying any object which can be represented as a point in n-space into one of m given subsets by constructing a linear function which is derived from the support function in linear topological space, an approach hitherto unexplored in this connection Greenberg and Konheim (1964) discussed this problem of classification scheme by presenting two possible procedures: one is to use pairwise class separation, and the other is to construct m linear functions which separate one of the sets from all the others. The former requires the construction of m (-1)/2 linear functions, and the latter places more stringent restrictions on the m subsets than the former. The author shows in this report how to construct

m instead of m (m-)/2, linear functions under the more liberal assumptions of the first procedure, thus combining the merits of both procedures. The application of his procedure to a problem in the classification of sequences of student responses on the PLATO teaching system is discussed. In that connection, a possible further development, an even simpler method requiring only one linear function, was explored. The validity of this simpler method could, however, be established only under rather restrictive conditions. (Author)

AD-641 138 **Field 6D**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
SOME FUNCTIONAL NEURAL NETWORKS.
Final rept.,
by James E. Swanekamp. 29 Apr 66, 48p
NOLTR-65-160

Descriptors: (*Bionics, *Nerve cells), (*Vision, Bionics), Learning machines, Mathematical models, Eye, Mechanical organs, Nervous system, Motion, Sensory perception, Pattern recognition, Electrophysiology, Electrical impedance.

Several types of neural networks were constructed using a D. C. pulseless type of neuron model as a basic element. These networks were combined in the construction of a simplified one-dimensional artificial eye to demonstrate a capability for sensing direction of motion. (Author)

AD-641 178 **Field 6D, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
AN ANALOG LINEAR CLASSIFICATION NETWORK.
Final rept.,
by Robert J. Biegalski. 27 Apr 66, 41p NOLTR-65-108
Projs. RREN-04/012/212/1/F008-21/02, RUDC-4B-000/212/1/F001-05/02

Descriptors: (*Networks, *Pattern recognition), Analog systems, Linear systems, Nerve cells, Models (Simulations), Signals, Classification, Learning machines.

A linear network was built to classify analog signals consisting of a large number of parallel inputs. These inputs were derived by a feature abstracting system using synthetic nerve networks. In this classification network the signals pass simultaneously through a maximum amplitude filter and then are classified by a resistive memory matrix. The maximum amplitude filter attenuates smaller inputs much more than larger ones and serves to 'pick out' predominant features. This is a way of utilizing the pandemonium concept of Selfridge. Classification by linear hyperplanes is discussed briefly and then the operation and design of the maximum amplitude filter is covered. (Author)

N66-37145 **Field 6D**
CFSTI Prices HC$2.50 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
A THEORETICAL ANALYSIS OF THE VISUAL ACCOMMODATION SYSTEM IN HUMANS.
by H. D. Crane. Sep 66, 79p NASA-CR-606
Contract NAS2-2760

Descriptors: *Human reaction, *Visual accommodation, Accommodation, Control, Eye, Human, Model, Muscle, Reaction, Retina, System, Visual.

For abstract, see STAR 04 22.

AD-641 252 **See Field 9B**

6E. CLINICAL MEDICINE

AD-640 635 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Nara Medical Coll., Kashihara City (Japan).
ELECTRON MICROSCOPE STUDY ON THE INFECTIOUS AND SERUM HEPATITIS.
Final rept. no. 10, Jul 65-Jul 66,
by Gonpachiro Yasuzumi. Sep 66, 18p
Contract DA-92-557-FEC-38436
Proj. DA-2N014501B71D
Task 035FE
ARDG (FE)-J-203-10

Descriptors: (*Serum hepatitis, Electron microscopy), Liver, Biopsy, Infectious hepatitis, Hepatitis viruses, Granules, Glycogen, Cytoplasm, Japan.

Biopsy materials from human liver in cases of serum hepatitis were studied in thin sections with the aid of electron microscopy and x-ray scanning microanalysis or electron probe microanalysis. In all the cases of serum hepatitis, glycogen granules appear always all over the cytoplasm of hepatic parenchymal cells, except for cases in which the cytoplasm is occupied by a large number of hemosiderin granules or ferritin particles. The glycogen granules are characteristically organized into 400 to 700 A rosettes composed of smaller granules approximately 200 A in diameter. The lipofuscin granules are often located in the vicinity of a cell boundary, close to a bile capillary. Dense particles 300 to 350 A in diameter, without being surrounded by a limiting membrane, are found in the cytoplasm of the hepatic parenchymal cell and in the dark inclusion body appearing in the intercellular space in almost all the cases of serum hepatitis, suggesting that they may represent the viral particles of serum hepatitis. (Author)

AD-640 683 **Field 6E**
Not available from CFSTI.
Armed Forces Inst. of Pathology, Washington, D. C. Cardiovascular Pathology Branch.
MYOCARDITIS: A REVIEW OF THE DEVELOPMENT OF THE CONCEPT.
by William C. Manion. 1966, 10p
Availability: Published in Medical Annals of the District of Columbia v35 n8 p405-14 Aug 1966.

Descriptors: (*Heart, Pathology), Cardiovascular diseases, Etiology, Diagnosis, Corynebacterium diphtheriae, Diseases, Reviews.

Developments in medicine that have influenced the problem of myocarditis and those contributions that seemed most significant are discussed.

AD-640 716 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Bahia Univ., Salvador (Brazil). Faculdade de Medicina.
THE CEREBRAL LOCALIZATION OF LANGUAGE FUNCTIONS.
Annual technical rept., Apr 65-Apr 66,
by Augusto Gentil Baptista. Apr 66, 36p
Grant DA-ARO-49-092-65-G74
Proj. DA-2N014501B71D-00-019-LA

Descriptors: (*Brain, Pathology), (*Trypanosoma, Diseases), (*Medical examination, *Neurology), Language, Tests, Phonetics, Reading, Auditory perception, Visual perception, Space perception, Motor reactions, Attention, Brazil.

Patients with Chagas' disease, followed in the wards or in a special outpatient clinic, after completion of a special clinical record form are being submitted to examination of language and related functions in accordance with the routine presented. This was elaborated in Portuguese to be used in Brazilian patients based on some common tests and on the author's personal experience. Out of the collected material, case records of 71 patients were considered as adequately documented. Only 15 (21%) had clinical or pathologic evidence of encephalic lesion, and it was surprising to find out that in as many as 48 (68%) patients abnormal results of the language tests had been obtained. Of the 56 patients who had no evidence of neurological lesión, 33 (59%) committed mistakes in the tests which had to be interpreted as of pathological meaning by current standards. Patients came from the lowest level of the local population. It was found that 66% of the patients were either entirelly illiterate or barely able to laboriously read and write. Post mortem examination of patients who died confirms, although not conclusively the impression derived from the analysis of clinical cases. The present findings indicate that cultural level is of prime importance in the interpretation of language tests. (Author)

AD-640 718 **Field 6E**
Not available from CFSTI.
Naval Medical Research Inst., Bethesda, Md.
OSSEOUS REPAIR OF TDE POSTEXTRACTION ALVEOLUS IN MAN.
Interim rept.,
by Philip J. Boyne. 1966, 12p
NAVMED-MR005.19.6037-10
Availability: Published in Oral Surgery, Oral Medicine and Oral Pathology v21 n6 p805-13 Jun 1966.

Descriptors: (*Surgery, *Mouth), (*Bone, *Healing), Dentistry, Teeth, Biopsy, Humans, Tetracyclines, Fluorescence, Microscopy, Histology, Dogs.

Recent fluorescent microscopic studies of postextraction healing in dogs have indicated the existence of hitherto unreported osseous repair phenomena. This study was undertaken to determine if such repair responses occur in man. Block section biopsies of healing 1st maxillary bicuspid alveoli were taken at various postoperative intervals in clinical patients. The resultant defects were grafted with freeze-dried homogenous bone. Tetracycline was administered to the patients at given times postoperatively to chronologically orient areas of osseous repair. Biopsy specimens subjected to ultraviolet microscopy revealed the first evidence of osseous repair to be located in the surrounding marrow vascular spaces at 7 days postoperatively. Subperiosteal apposition along the palatal cortex was demonstrated. The first evidence of new bone in the alveolus proper was 10 days after surgery. The results of this study indicate that extra-alveolar repair phenomena observed in laboratory animals also occur in man. (Author)

AD-640 745 **Field 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Dept. of Metabolism.
POTASSIUM DEPLETION IN HEAT STROKE: A POSSIBLE ETIOLOGIC FACTOR,
by Jack W. Coburn, and Richard C. Reba. 1966, 11p
Availability: Published in Military Medicine v131 n8 p678-87 Aug 1966.

Descriptors: (*Heat tolerance, *Potassium), Shock (Pathology), Etiology, Exposure, Stress (Physiology), Acclimatization, Pathology, Histology.

A reduced exchangeable potassium content was found in a patient with fatal heat stroke. Various aspects of the etiology and pathogenesis of heat stroke are reviewed. The features associated with heat exposure which would be expected to result in reduced body potassium are presented, and data are collected which indicate that potassium depletion may have been frequent among previously reported heat stroke victims. An association between potassium depletion and heat stroke could result if potassium depletion increased the susceptibility of a person to heat injury. Although this report does not establish a cause and effect relationship between potassium depletion and susceptibility to heat stroke, it does suggest that such a relationship might exist. (Author)

AD-640 747 **Field 6E, 6A**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Biochemistry.

SHOCK ASSOCIATED WITH DENGUE INFECTION. I. CLINICAL AND PHYSIOLOGIC MANIFESTATIONS OF DENGUE HEMORRHAGIC FEVER IN THAILAND, 1964,
by Sanford N. Cohen, and Scott B. Halstead.
1966, 10p
Availability: Published in Journal of Pediatrics v68 n3 p448-56 Mar 1966.

Descriptors: (*Dengue, Diseases), Shock (pathology), Public health, Children, Blood proteins, Deficiency diseases, Therapy, Pathology, Serodiagnosis, Etiology, Electrolytes (Physiology), Thailand.

Identifiers: Hemorrhagic fever.

Dengue hemorrhagic fever is a serious medical and public health problem throughout Southeast Asia. It affects children primarily and is a major cause of death in pediatric patients in the countries of that area. Hypoproteinemia seems to play a role both in the development of shock during dengue hemorrhagic fever and in the patients' response to therapy. This hypoproteinemia may represent an effect of dengue infection itself and information on its frequency in patients with dengue fever is needed. A planned program of fluid, electrolyte, and plasma protein therapy appears to prevent death in most instances. Therapy should probably be limited to such supportive measures, since there is no specific treatment for the syndrome. (Author)

AD-640 748 **Field 6E, 6A**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Dept. of Experimental Pathology.
A STUDY OF GAMMA GLOBULINS IN CHOLERA,
by Howard B. Goldstein, Ben N. Dale, and Oscar Felsenfeld. 1966, 3p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v121 p425-7 1966.

Descriptors: (*Cholera, *Gamma globulin), Electrophoresis, Blood proteins, Aggluitinins, Toxicity, Vibrio, Diseases.

The immunoelectrophoretic patterns of the gamma globulins were studied in the sera of Thai patients infected with Vibrio cholerae, Ogawa type. Normal Thai sera and sera obtained from Japanese vaccinees were used as controls. Relations were sought between the protein patterns, and the agglutinin titers as well as the cholera toxigenicity neutralizing ability (CTNA) of the sera. The immunologic response to cholera infection was similar to that in other bacterial diseases. A higher CTNA was noted in natural infection than after vaccination. As a group, the cholera patients had a high incidence of gamma-M-globulin in sera taken in the acute phases of the disease. It is suggested that this might be due either to a rapid increase of this globulin or to the presence of concomitant and/or chronic disease. (Author)

AD-640 749 **Field 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Dept. of Epidemiology.
THE FAILURE OF GAMMA GLOBULIN AS A PROPHYLACTIC AGENT IN MENINGOCOCCAL DISEASE,
by Donald W. Sample, John R. Gauld, James H. Warram Jr, Phillip E. Winter, and Karel Runcik.
1966, 7p
Availability: Published in American Journal of Epidemiology v84 n1 p156-62 1966.

Descriptors: (*Gamma globulin, Neisseria meningitidis), (*Neisseria meningitidis, Immunity), Medicine, Resistance (Biological), Effectiveness.

A controlled field study of the use of gamma globulin as a prophylactic agent for the prevention of meningococcal disease is described. No evidence was obtained that the intramuscular administration of 0.05 ml per pound of body weight of this product was effective. (Author)

AD-640 772 **Field 6E**
Not available from CFSTI.
California Univ., Los Angeles. School of Medicine.
URINARY BLADDER CALCULI FORMED IN RATS AT ALTITUDE,
Revised ed.,
by Abraham T. K. Cockett, R. M. Nakamura, and D. S. Miyada. 27 May 65, 6p
Contract AF 49 (638)-1387, Grant NsG-237-62
Proj. AF-7164
Task 716402
AFSOR-66-0851
Revision of manuscript received 6 May 65. Prepared in cooperation with Harbor General Hospital, Torrance, Calif.
Availability: Published in Arch Environ Health v11 p810-13 Dec 1965.

Descriptors: (*Urinary system, *Calculi), High altitude, Pathology, Chemical analysis, Infrared spectroscopy, Quantitative analysis, Proteus, Rats.

A method is outlined for the formation of experimental bladder calculi in male rats. Chemical analysis of bladder calculi formed in rats at an altitude of 18,000 feet for a period of nine weeks reveals no significant differences from calculi formed in rats at ground levels. Infrared spectral analysis confirms the quantitative chemical findings. There was an increased incidence of Proteus organisms in the altitude group. (Author)

A-640 806 **Field 6E**
Not available from CFSTI.
California Univ., Los Angeles. School of Medicine.
PSYCHOLOGICAL FACTORS IN DECOMPRESSION SICKNESS,
by Abraham T. Cockett, Robert M. Nakamura, and Ray T. Kado. 22 Jul 65, 7p
Contract AF 49 (638)-1387, Grant NsG-237-62
Proj. AF-7164
Task 716402
AFOSR-66-0850
Availability: Published in Arch. Environ Health v11 760-4 Dec 1965.

Descriptors: (*Decompression sickness, Therapy), Dextran, Parenteral infusions, Pathology, Hypothermia, Blood plasma.

A method for the production of experimental decompression sickness -- dysbarism -- is outlined. Dextran infusion in replacement therapy appears beneficial. The mechanisms operating in dysbarism are mentioned. Hypothermia appears to be useful and may be indicated. Recompression is the treatment of choice. However, plasma replacement is clearly indicated. (Author)

AD-640 815 **Field 6E**
Not available from CFSTI.
Army Research Inst. of Environmental Medicine, Natick, Mass. Pharmacology and Therapeutics Lab.
HEMODIALYSIS OF THE RAT,
by Sumner M. Robinson, David A. Hurwitz, Robert Louis-Ferdinand, and William F. Blatt. 5 Jan 66, 12p
Availability: Published in Canadian Journal of Physiology and Pharmacology v44 p849-59 1966.

Descriptors: (*Blood, Purification), Blood chemistry, Carbohydrates, Chromatographic analysis, In vitro analysis, In vivo analysis, Rats.

Identifiers: Extracorporeal circulation.

A technique is described for hemodialysis of either anesthetized or non-restrained rats. In the apparatus the dialysis plates of an autoanalyzer system are used with only minor modification. The efficiency of this method has been evaluated with regard to the clearance of saccharides, both in vitro and in vivo, as well as the extraction of nitrogenous low molecular weight moieties from circulating blood. Approximately 50% of the dialyzable material was obtained in a 1-hour dialysis. Further fractionation of the dialyzate was accomplished by gel filtration (Sephadex G-25). (Author)

AD-640 909 **Field 6E**
Not available from CFSTI.
Manitoba Univ., Winnipeg. Dept. of Surgery.
A REVIEW OF THE LITERATURE ON BURNS AND TRAUMA, SEPTEMBER 1964 TO AUGUST 1965,
by W. Reid Waters. 1965, 44p
Availability: Published in Medical Services Journal Canada v2 n2 p99-141 Feb 1966.

Descriptors: (*Burns, Bibliographies), (*Wounds ; injuries, Bibliographies), Reviews, Radiation injuries, Therapy, Thermal radiation, Clostridium, Diseases, Cardiovascular diseases, Clostridium tetani, Healing, Shock (Pathology), Thorax, Head, Abdomen, Urinary system, Neurology, Spinal cord, Motor vehicle accidents, Children, Metabolism, Extremities, Accidents, Ophthalmology, Fractures (Bone), Medical research, Canada.

This review was prepared for the annual report of the panel on the management of burns and wounds of the Defence Medical Research Advisory Committee, Defence Research Board. Material covers the following: burns, radiation, wounds, shock, emergency rooms and mass casualties, trauma, and fractures.

AD-640 969 **Field 6E, 6S, 6N**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Inst., Oklahoma City, Okla.
CLINICAL AVIATION MEDICINE: A PHYSICAL-CONDITIONING PROGRAM FOR CARDIAC PATIENTS - A PROGRESS REPORT,
by John Naughton, Michael T. Lategola, and Kamal Shanbour.Jun 66, 16p
AM-66-21

Descriptors: (*Heart, Pathology), (*Cardiovascular diseases, Therapy), Exercise, Physical fitness, Atherosclerosis, Blood pressure, Males, Stress (Physiology).

Identifiers: Myocardial infarction.

Twenty men with well-documented episodes of myocardial infarction participated in a physical-conditioning program for 3 months or longer during the past 2 years. The activity consisted of intermittent jogging, calesthenics, and competitive games conducted as 1-hour sessions 5 days a week. Average participation by each individual was 3 days a week. Nineteen of the twenty patients returned to full employment; three were hospitalized a total of five times for minor noncardiac complaints; ten have discontinued the program for a variety of reasons and four have been vigorous participants for over a year. Three patients have died; two of presumed recurrent episodes of myocardial infarction and one of suicide. Two deaths have also occurred in an aged-matched group of sedentary cardiac patients during a comparable period of time, but, in addition, they have had four more episodes of myocardial infarction. The results to date indicate that cardiac patients can be physically rehabilitated without fear of jeopardizing their clinical course. (Author)

AD-640 970 **Field 6E, 6S, 6N**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Inst., Oklahoma City, Okla.
PROBLEMS IN AEROMEDICAL CERTIFICATION: CARDIOVASCULAR RESPONSE TO EXERCISE FOLLOWING MYOCARDIAL INFARCTION,
by John Naughton, Kamal Shanbour, Michael T. Lategola, J. McCoy, and R. Armstrong. Jun 66, 12p
AM-66-17

Descriptors: (*Heart, Pathology), (*Cardiovascular system, Exercise), Physical fitness, Cardiovascular diseases, Blood pressure, Pulse rate, Stress (Physiology).

Identifiers: Myocardial infarction.

In order to evaluate the quality of the cardiovascular adjustments of cardiac patients to exercise, 12 men who had recovered from well-documented episodes of myocardial infarction were evaluated with a work-capacity test while sedentary and after 8 months of regular, vigorous physical activity. Their responses were compared with those of 12 other cardiac patients and 12 healthy men tested in a similar manner at 8-month intervals. Prior to reconditioning, the 12 cardiac patients had blood-pressure and pulse-rate responses similar to those recorded in the two sedentary groups at comparable levels of energy expenditure. Following the reconditioning, however, these 12 patients had significantly lower levels of systolic and diastolic blood pressure ($P<0.05$) and significantly lower pulse rates ($P<0.05$) throughout testing. These results suggest that the asymptomatic cardiac patient with a well-healed myocardial infarction has the ability to respond to physical conditioning in a manner similar to that observed to occur in presumably healthy individuals. These cardiovascular adjustments following training reflect a more efficient cardiovascular mechanism for adjusting to physical stress. (Author)

AD-640 973 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE LIVER AND IDIOPATHIC HYPERLIPEMIA,
by L. Kucerova, A. Stork, and V. Volek. 25 Apr 66, 7p FTD-TT-66-18
TT-6-62509
Unedited rough draft trans. of Unidentified mono., Prague, 1965 p6-7.

Descriptors: (*Liver, Pathology), Hepatitis (Nonviral), Diagnosis, Blood chemistry, Liver function tests, Lipids, Lipoproteins, USSR.

Twelve idiopathic hyperlemia patients were investigated ranging in age from 30 to 58 years, and the average was 44.5 years. All patients were hospitalized and they were investigated extensively, both clinically and laboratorily.

AD-640 981 **Field 6E**
CFSTI Price: MF$1.25
Prosthetic and Sensory Aids Service, Veterans Administration, Washington, D. C.
BULLETIN OF PROSTHETICS RESEARCH,
by William M. Bernstock. 1966, 199p BPR-10-5-Spring-1966
Availability: Superintendent of Documents, GPO, Washington, D. C. 20402, HC$0.65, as VA1.23/3:10-5.

Descriptors: (*Prosthetics, Reports), Blindness, Reading, Rehabilitation, Speech, Printing, Feet, Amputation stumps, Joints (Physiology), Pneumatic devices, Hooks, Medical research.

Contents: Reading machines for the blind; The Optophone: Its beginning and development; Factors affecting reading machine instruction in rehabilitation centers; Potential uses of the optophone; Problems in machine conversion of print to 'Speech'; Prevention and correction of fixed equinus deformity in Mid-foot amputations; A simplified below-knee prosthesis; Evaluation of the Heidelberg Pneumatic Prosthesis; Adult center control hook; Lift tab positioning jig; Semiannual report of the VAPC.

AD-640 995 **Field 6E, 6A**
CFSTI Prices: HC$3.00 MF$0.50
Linde Div., Union Carbide Corp., Tonawanda, N. Y.
MECHANISMS OF FREEZING INJURY TO BIOLOGICAL SYSTEMS.
Final rept.,
by G. F. Doebbler. 30 Sep 66, 94p
Contract Nonr-4788 (00)

Descriptors: (*Freezing, *Wounds + injuries), Tissues (Biology), Pathology, Erythrocytes, Mitochondria, Proteins, Enzymes, Chromatographic analysis, Water, Liver, Dehydration, Molecular properties, Lipoproteins, Absorption (Biological), Permeability, Electrolytes (Physiology).

Identifiers: Cryobiology.

Biophysical and biochemical studies were conducted on red cells, liver mitochondria, and various proteins to determine the mechanisms of freezing injury to biological systems. The working hypothesis formulated was that freezing resulted in molecular level dehydration leading to changes in proteins in terms of contractile behavior, enzymatic activity, interactions with water, and molecular size or shape. In general the evidence obtained, especially with proteins, and in particular by measurements of desorption-adsorption isotherms for water and gel chromatography showed no freeze related changes. Serum lipoproteins and frozen red cell membranes showed irreversibility in desorption-adsorption of water. Rat liver mitochondria were unaltered in contractile behavior by a variety of freezing conditions, some known to markedly alter function and permeability. Red cells (RBC) sustained cation composition changes (K decrease; Na increase) and ATPase activity increase when subjected to dehydration (without ice or increased salt exposure) which resembled that found with freezing. Kinetics of salt injury to RBCs and the dependence on temperature was found inconsistent with salt as the only agent of freezing injury. (Author)

N66-30613 **Field 6E**
CFSTI Prices HC$1.00 MF$0.50
California Univ., Los Angeles. School Of Medicine.
PERINEAL ABSCESS SECONDARY TO GAS GANGRENE - USE OF HYPERBARIC OXYGEN AS A THERAPEUTIC ADJUNCT IN A CASE.
by A. T. Cockett, and C. S. Hatch. 1966, 10p
NASA-CR-76242
Grant NSG 237-62

Descriptors: *High pressure oxygen, *Human pathology, *Medicine, *Oxygen treatment, Difficulty, Drug, High pressure, History, Human, Infection, Male, Oxygen, Pathology, Penicillin, Surgery, Therapy, Tract, Treatment, Urology.

For abstract, see STAR 04 17.

N66-30749 **Field 6E**
CFSTI Prices HC$1.00 MF$0.50
Technology, Inc., Dayton, Ohio.
INVESTIGATION OF STRENGTH OF ISOLATED VERTEBRAE QUARTERLY REPORT, 30 JAN. - 29 MAY 1966.
by J. F. Crocker, and L. S. Higgins. 1966, 21p
NASA-CR-76296, TI-1313-66-2
Contract NASW-1313

Descriptors: *Human body, *Load test, *Vertebral column, Body, Column, Dynamic, Human, Load, Measurement, Pressure, Static, Strength, Test, Transducer, Vertebra.

For abstract, see STAR 04 17.

PB-172 404 **Field 6E**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK I. ASSESSMENT AND DEFINITION OF THE PROBLEM.
Dec 65, 71p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), Cardiovascular diseases, Hospitals, Atherosclerosis, Diseases, Anomalies, Statistical data, Population.

PB-172 405 **Field 6E**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK II. CHARACTERIZATION OF THE BIOMEDICAL AND TECHNOLOGICAL PROBLEMS. VOLUME II-A. DISCUSSION OF PROBLEMS.
Dec 65, 59p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), Prosthetics, Cardiovascular system, Blood pressure, Blood circulation, Heat production (Biology), Thrombosis, Hemolysis, Materials, Anatomy, Surgery, Medical personnel, Contamination, Reliability, Law, Sociology, Psychology.

Contents: Input-output requirements; Pressure profile; Flow rate power; Autoregulation; Heat rejection; Blood handling requirements; Thrombosis; Hemolysis; Materials; Anatomy; Surgical requirements; Personnel and facilities; Contamination control; Reliability and durability; Legal, moral and socio-psychological implications.

PB-172 406 **Field 6E**
CFSTI Prices: HC$6.00 MF$1.25
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK II. CHARACTERIZATION OF THE BIOMEDICAL AND TECHNOLOGICAL PROBLEMS. VOLUME II-B. DISCUSSION OF FUNCTIONAL REQUIREMENTS.
Dec 65, 243p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), Cardiovascular system, Prosthetics, Implants, Blood circulation, Blood pressure, Blood volume, Heat production (Biology), Anatomy, Thrombosis, Blood coagulation, Hemolysis, Materials, Decontamination, Law, Sociology, Psychology.

Contents: Cardiology; Temporary ventricular assist devices; Permanent implanted artificial heart; Pulsatile flow requirements; Output power and flow rate requirements; Physiological regulation of cardiac output, Arterial blood pressure and blood volume; Heat production and elimination; Anatomy; Blood handling; Physical chemistry of thrombosis and clotting; Hemolysis considerations; Materials requirements; Decontamination requirements; Legal, moral, and socio-psychological implications.

PB-172 407 **Field 6E**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK III. TECHNOLOGY SURVEY AND DATA COMPILATION. VOLUME III-A. SUMMARY.
Dec 65, 77p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), Power supplies, Radioactive isotopes, Energy conversion, Blood, Pumps, Valves, Materials, Blood coagulation, Prosthetics, State-of-the-art reviews, Implants, Abdomen, Heat production (Biology).

PB-172 408 Field 6E
CFSTI Prices: HC$6.00 MF$1.50
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK III. TECHNOLOGY SURVEY AND DATA COMPILATION. TASK III. VOLUME III-B. TECHNOLOGY SURVEY.
Dec 65, 298p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), State-of-the-art reviews, Power supplies, Radioactive isotopes, Heat production (Biology), Batteries + components, Pneumatic systems, Energy conversion, Thermoelectricity, Fuel cells, Thermionic emission, Implants, Blood, Pumps, Engines + motors, Solenoids, Piezoelectric transducers, Pumps, Compressors, Hydraulic systems, Prosthetics, Gears, Bearings, Seals, Surgical instruments.

PB-172 416 Field 6E
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK VI. ASSESSMENT OF OTHER RESOURCES FOR RESEARCH AND DEVELOPMENT.
1965, 78p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), Prosthetics, Research program administration, Production, Distribution, Installation, Diagnosis, Medical personnel, Surgery, Blood, Blood transfusions.

PB-172 417 Field 6E
CFSTI Prices: HC$4.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK V. DETERMINATION OF KEY TECHNICAL PROBLEMS.
Dec 65, 102p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), Blood, Pumps, Control systems, Heat production (Biology), Power supplies, Pneumatic systems, Fluid flow, Prosthetics.

PB-172 418 Field 6E
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT. TASK IV. ESTIMATION OF FUTURE EXTENSIONS IN TECHNOLOGY.
Dec 65, 67p
Contract PH43-65-1060
Final summary report cataloged as PB-169 834.

Descriptors: (*Heart, *Mechanical organs), Radioactive isotopes, Batteries + components, Heat production (Biology), Thermoelectricity, Fuel cells, Blood, Pumps, Surgical instruments, Medical equipment, Power supplies, Costs, Prosthetics.

PB-172 434 Field 6E
CFSTI Prices: HC$7.00 MF$1.75
Thermo Electron Engineering Corp., Waltham, Mass.
CHARACTERIZATION OF BIOMEDICAL AND TECHNOLOGICAL PROBLEMS. TASK 2. VOLUME 1.
Dec 65, 344p TE-36-66-Vol-1
Contract PH43-55-9
Prepared in cooperation with Children's Hospital Medical Center, Boston, Mass. Report on the Artificial Heart Program. Final summary rept. cataloged as PB-169 833.

Descriptors: (*Heart, *Mechanical organs), Cardiovascular system, Cardiovascular diseases, Arrhythmia, Prosthetics, Pathology, Electrophysiology, Pulse rate, Nutrition, Oxygen consumption, Metabolism, Blood circulation, Erythrocytes, Blood platelets, Leukocytes, Blood proteins, Blood coagulation, Body temperature, Radiation effects.

Contents: Emergency treatment; The physiology of normal and pathological cardiovascular system; Left ventricular assist devices; Total heart replacement; Blood properties; Blood-materials interface; Heat rejection within the body; Radiation within the body; Non-technical problem areas.

PB-172 435 Field 6E
CFSTI Prices: HC$7.00 MF$1.75
Thermo Electron Engineering Corp., Waltham, Mass.
CHARACTERIZATION OF BIOMEDICAL AND TECHNOLOGICAL PROBLEMS. TASK 2. VOLUME 2.
Dec 65, 342p TE-36-66-Vol-2
Contract PH43-55-9
Prepared in cooperation with Children's Hospital Medical Center, Boston, Mass. Report on the Artificial Heart Program. Final summary rept. cataloged as PB-169 833.

Descriptors: (*Heart, *Mechanical organs), Leukocytes, Erythrocytes, Blood platelets, Blood proteins, Aorta, Prosthetics, Heat exchangers, Blood coagulation, Body temperature, Heat transfer, Implants, Radiation effects, Dose rate, Law, Economics, Public opinion, Rehabilitation.

Contents: Blood properties: White blood corpuscles; erythrocytes; platelets; plasma proteins. Blood-materials interface: Requirements of interface; experimental results on particular materials; theoretical considerations; metal aortic prostheses as heat-exchangers preliminary experiments with dogs; waterfall sequence for intrinsic blood clotting. Heat rejection within the body: Body-temperature regulation; methods of heat rejection from within the body; preliminary heat transfer analysis of a blood cooled heat exchanger for implantation in the body. Radiation within the body: Biological effects of radiation; history of radiation protection and control; recommendations and guide lines for the program; dose rates from medical and utility radiation sources; background radiation data. Non-technical problem areas: Religious, psychological, ethical and moral problems; legal problems; problems of economics and public policy; excerpt from 'The Rebuilt Man'; excerpt from 'Clinical Investigation in Medicine: Legal, Ethical, and Moral Aspects'; vocational rehabilitation services for heart patients.

PB-172 436 Field 6E
CFSTI Prices: HC$7.00 MF$1.50
Thermo Electron Engineering Corp., Waltham, Mass.
TECHNOLOGY SURVEY AND REFERENCE DATA COMPILATION. TASK 3. VOLUME 1.
Jan 66, 313p TE-48-66-vol-1
Contract PH43-55-9
Prepared in cooperation with Children's Hospital Medical Center, Boston, Mass. Report on the Artificial Heart Program. Final summary rept. cataloged as PB-169 833.

Descriptors: (*Heart, *Mechanical organs), Prosthetics, Power supplies, Radioactive isotopes, Batteries + components, Alkaline cells, Carbon dioxide, Thulium, Lithium compounds, Hydrides, Solenoids, Piezoelectric crystals, Hydraulic systems.

Contents: Energy sources for prosthetic hearts: possible energy sources; radioisotope fuel selection; battery powered system; nickel cadmium batteries; new pocket-plate nickel cadmium battery; comparison of freon 12 and CO2 for external power on orthoses and prostheses; carbon dioxide as a source of external power for prosthetic devices; thulium-171 - production and costs; derivations of activity, mass and power equations; physical, chemical and radiological characteristics of heat source material; calculations of helium pressure buildup in Pu-238 fuel capsule; lithium hydride containment. Conversion mechanisms: converter for a battery powered artificial heart; converter for a radioisotope powered artificial heart; converter for thermal energy storage power heart; solenoid design for a prosthetic heart; the piezoelectric artificial heart; the development of hydraulic control of an artificial heart.

PB-172 437 Field 6E
CFSTI Prices: HC$7.00 MF$1.75
Thermo Electron Engineering Corp., Waltham, Mass.
TECHNOLOGY SURVEY AND REFERENCE DATA COMPILATION. TASK 3. VOLUME 2.
Jan 66, 373p TE-48-66-vol-2-Task 3
Contract PH43-55-9
Prepared in cooperation with Children's Hospital Medical Center, Boston, Mass. Report on the Artificial Heart Program. Final summary rept., cataloged as PB-169 833.

Descriptors: (*Heart, *Mechanical organs), Blood, Pumps, State-of-the-art reviews, Design, Prosthetics, Heat transfer, Blood pressure, Blood circulation, Fluid flow, Surgery, Implants, Radioactive isotopes, Batteries + components, Control systems.

Contents: Blood pumps: the state of the art of blood pumps; blood pump design; artificial cardiac prostheses. Heat rejection: summary of preliminary heat transfer analysis and experiments; design approach for the total heart replacement; heat transfer at the ventricle surfaces. Controls: controls approaches to provide efficient pulsatile actuation of the blood pumps; steady state controls analysis of a total heart replacement with cardiac output controlled by venous return and venous pressure; steady state blood flow equalization for both ventricles of the total heart replacement, and the ability to pump unequal transient flows. Total heart replacement: surgical implantation of the total heart replacement; radioisotope system; system with a radioisotope energy source with thermal energy storage; rechargeable thermal energy storage system; rechargeable battery powered system; externally powered battery system; comparison of the feasible approaches for a fully implanted total heart replacement. Assist systems: emergency assist device; temporary left ventricular assist device; permanent assist devices.

PB-172 438 Field 6E
CFSTI Prices: HC$7.70 MF$2.00
Thermo Electron Engineering Corp., Waltham, Mass.
ESTIMATED FUTURE EXTENSIONS OF TECHNOLOGY. TASK 4. DETERMINATION OF KEY TECHNICAL PROBLEM AREAS. TASK 5. ASSESSMENT OF OTHER RESOURCES FOR ARTIFICIAL HEART DEVELOPMENT. TASK 6. DETERMINATION OF PERFORMANCE CRITERIA FOR THE ARTIFICIAL HEART. TASK 7.
Dec 65, 468p TE-48-66-Tasks 4-7
Contract PH43-55-9
Prepared in cooperation with Children's Hospital Medical Center, Boston, Mass. Report on the Artificial Heart Program. Final summary rept., cataloged as PB-169 833.

Descriptors: (*Heart, *Mechanical organs), Prosthetics, Power supplies, Energy conversion, Blood, Pumps, Control systems, Therapy, Cardiovascular diseases, Obstruction (Physiology), Blood circulation, Oxygen consumption, Fatigue (Mechanics), Research program administration, Performance (Engineering), Feasibility studies, Costs, Rehabilitation.

Identifiers: Extracorporeal circulation.

Assessment of other resources for artificial heart development: survey of governmental and private organizations; evaluation of other resources for artificial heart development. Determination of performance criteria for the artificial heart: performance characteristics; physical characteristics; technical feasibility; cost; vocational rehabilitation; resource requirements.

PB-173 050 **Field 6E**
CFSTI Prices: HC$5.00 MF$1.00
Hittman Assoc., Inc., Baltimore, Md.
ANALYTICAL REPORT ON SIX STUDIES BASIC TO CONSIDERATION OF THE ARTIFICIAL HEART PROGRAM. VOLUME I. ASSESSMENT OF NEED AND CHARACTERIZATION OF THE PROBLEMS.
22 Jul 66, 188p HIT-223-Vol-1
Contract PH43-66-99
See also PB-173 051, PB-173 052, PB-173 053.

Descriptors: (*Heart, *Mechanical organs), Cardiovascular diseases, Mortality rates, Costs, Implants, Medical personnel, Hospitals, Research program administration, Prosthetics.

The purpose of the task is to assess the magnitude of the heart disease problem and estimate the ability of artificial heart devices to alleviate it. The devices primarily considered are the heart support devices, i.e., devices working in conjunction with a damaged heart to carry part of the circulatory burden, and total heart replacement devices. In addition, emergency and temporary support devices are considered and the need for widespread use of such devices as part of an overall attack on heart disease is discussed. Pacemakers and artificial valves are mentioned briefly in a number of places where their use relates to the circulatory assist devices. The report is an analysis and integration of six parallel studies, referred to as the 'Basic Studies' performed by six contractors. The procedure followed was to prepare a detailed analysis of each contractor's work in turn and then consider in detail the sum of all arguments, methods, and conclusions, to arrive at a single integrated picture which seems most coherent and best supported by the totality of evidence submitted.

PB-173 051 **Field 6E**
CFSTI Prices: HC$6.00 MF$1.25
Hittman Assoc., Inc., Baltimore, Md.
ANALYTICAL REPORT ON SIX STUDIES BASIC TO CONSIDERATION OF THE ARTIFICIAL HEART PROGRAM. VOLUME II. TECHNOLOGY SURVEY FOR ARTIFICIAL HEART DEVICES.
26 Jul 66, 213p HIT-223-Vol-2
Contract PH43-66-99
See also PB-173 050.

Descriptors: (*Heart, *Mechanical organs), Blood circulation, Blood pressure, Power supplies, Energy conversion, Radioactive isotopes, Radiological dosage, Batteries + components, Pneumatic devices, Hydraulic systems, Radiation effects, Prosthetics, Valves, Monitors, Diagnosis, Instrumentation, Implants, Pumps, Surgical techniques, Heat production (Biology), Thermal insulation, Fuel cells, Materials.

Contents: Blood circulation mechanisms: emergency devices; assist devices; total heart replacement devices; control and regulation; valves. Materials and their compatibility: preparation and fabrication; effect of biological environment on materials; effect of materials on the biological environment; expected advances in materials technology. Energy: energy sources; energy storage; energy conversion; technical extensions. Power: power conditioning; power conversion; power transmission. Ancillary considerations: medical and system diagnostic/monitoring instrumentation; radiation effects; percutaneous leads; endogenous heat dissipation; surgical techniques, equipment and personnel.

PB-173 052 **Field 6E**
CFSTI Prices: HC$3.00 MF$0.75
Hittman Assoc., Inc., Baltimore, Md.
ANALYTICAL REPORT ON SIX STUDIES BASIC TO CONSIDERATION OF THE ARTIFICIAL HEART PROGRAM. VOLUME III. PROGRAM RECOMMENDATIONS.
15 Aug 66, 70p HIT-223-Vol-3
Contract PH43-66-99
See also PB-173 051.

Descriptors: (*Heart, *Mechanical organs), Research program administration, Specifications, Blood, Pumps, Prosthetics, Materials, Control, Energy conversion, Nuclear energy, Feasibility studies.

Contents: Specification of required devices: emergency devices; temporary support devices; permanent devices; matrix of required devices. Major problem areas: problem areas as identified by contractors; blood pumps; blood prosthesis interactions; materials; control of the artificial heart; energy systems; production and distribution; feasibility of artificial heart devices. Program recommendations: grant support vs. contractual support; development program; program organization.

PB-173 053 **Field 6E, 7D, 11I, 11J K**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF BLOOD-COMPATIBLE POLYMERIC MATERIALS.
Summary rept.,
by R. D. Falb, G. A. Grode, M. Luttinger, M. M. Epstein, and B. Drake. 22 Jun 66, 80p
Contract PH43-64-496
See also PB-173 052.

Descriptors: (*Heart, *Mechanical organs), (*Polymers, Mechanical organs), Heparin, Epoxy plastics, Acrylonitrile polymers, Styrene plastics, Polyethylene plastics, Nylon, Carbonates, Polyvinyl chloride, Glass, Polyester plastics, Elastomers, Hemolysis, In vivo analysis, Degradation, Proteins, Blood coagulation.

AD-640 778 **See Field 6O**

6F. ENVIRONMENTAL BIOLOGY

N66-31221 **Field 6F**
CFSTI Prices HC$2.00 MF$0.50
Franklin Inst., Philadelphia, Pa. Research Labs.
EFFECTS OF REPRODUCIBLE MAGNETIC FIELDS ON THE GROWTH OF CELLS IN CULTURE FINAL REPORT, MAY 1, 1965 - APR. 30, 1966.
by M. H. Halpern. 1966, 31p NASA-CR-75121, Q-B2375-4
Contract NSR-39-005-020

Descriptors: *Culture (biol), *Germination, *Magnetic field intensity, *Plant (biol), Ambient, Animal, Cell, Environment, Exposure, Field, Growth, Intensity, Magnetic, Parameter, Reproduction, Seed, Test, Zero.

For abstract, see STAR 04 17.

N66-31639 **Field 6F**
CFSTI Prices HC$4.00 MF$1.00
Smithsonian Astrophysical Observatory, Cambridge, Mass.
SELECTED STUDIES IN EXOBIOLOGY, PLANETARY ENVIRONMENTS, AND PROBLEMS RELATED TO THE ORIGIN OF LIFE SEMIANNUAL PROGRESS REPORT NO. 1, 1 OCT. 1965 - 31 MAR. 1966.
by C. Sagan. 1966, 130p NASA-CR-76106
Contract NGR-09-015-023

Descriptors: *Astrophysics, *Cloud physics, *Earth, *Jupiter (planet), *Mariner ii space probe, *Mars (planet), *Planetary atmosphere, *Thermodynamic equilibrium, *Venus, Analysis, Atmosphere, Carbon, Cloud, Data, Dioxide, Equilibrium, Evaluation, Ionization, Microwave, Nitrogen, Observation, Physics, Planet, Probe, Radiometer, Space, Thermodynamics.

For abstract, see STAR 04 17.

N66-31704 **Field 6F**
CFSTI Prices HC$2.50 MF$0.50
Stanford Univ., Calif. Instrumentation Research Lab.
MEMBRANE SEPARATION.
by J. Lundstrom. Apr 66, 54p NASA-CR-76431, IRL-1046, REV.
Grant NSG-81-60
Revised

Descriptors: *Carbon dioxide, *Glucose, *Membrane, *Permeability, Carbon, Coefficient, Detection, Device, Diffusion, Dioxide, Metabolism, Microorganism, Rate, Rubber, Sensitivity, Separation, Silicone.

For abstract, see STAR 04 17.

N66-37566 **Field 6F**
CFSTI Prices HC$1.00 MF$0.50
Colorado State Univ., Fort Collins.
THE USE OF PATHOGEN-FREE PLANTS IN A MICROCOSM, PART II FINAL REPORT, JAN. 1 - JUN. 30, 1966.
by R. Baker. 1966, 11p NASA-CR-78354
Grant NSG-78-60
Submitted For Publication

Descriptors: *Environmental chamber, *Gnotobiotics, *Plant (biol), Bioengineering, Control, Design, Environment, Free, Growth, Pathogen, Prototype.

For abstract, see STAR 04 22.

N66-37585 **Field 6F**
CFSTI Prices HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
EVALUATION OF THE EFFICIENCY OF A CLASS 100 LAMINAR-FLOW CLEAN ROOM FOR VIABLE CONTAMINATION CLEANUP. PART I - MICROBIOLOGICAL STUDIES RELATING TO CLEAN ENVIRONMENTS.
by J. W. Beakley, J. C. Mashburn, and W. J. Whitfield. Sep 66, 10p NASA-CR-78342, SC-RR-66-385
NASA ORDER R-09-019-040

Descriptors: *Clean room, *Contamination, *Laminar flow, *Particle detector, Air, Airborne, Bacteria, Efficiency, Electronic, Microbiology, Spore, System, Viability.

For abstract, see STAR 04 22.

ORNL-3957 **Field 6F**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
ECOSYSTEMS, SYSTEMS ECOLOGY, AND SYSTEMS ECOLOGISTS,
by George M. Van Dyne. Jun 66, 33p
Contract W-7405-eng-26

Descriptors: (*Ecology, Systems engineering), (*Health physics, Ecology).

For abstract, see NSA 20 21.

6G. ESCAPE, RESCUE, AND SURVIVAL

PB-173 189 **See Field 3B**

6H. FOOD

AD-640 823 **Field 6H**
CFSTI Prices: HC$3.00 MF$0.75
Georgia Experiment Station, Experiment.
STORAGE STABILITY OF CIVIL DEFENSE SHELTER RATIONS.
Annual rept. no. 4, 21 Jun 65-20 Jun 66,
by J. G. Woodroof, and S. R. Cecil. Oct 66, 77p
Contracts DA-19-129-QM-2050 (N), OCD-OS-62-156
USA-NLABS-TR-67-25-CD

Descriptors: (*Food, Storage), Stability, Civil defense systems, Preservation, Fiberboard, Containers, Physical properties, Taste, Fallout shelters.

Progress is reported on storage of (1) 4 lots of survival crackers, 4 lots of survival biscuits, and 2 lots of bulgur wafers for 36 months, and (2) 3 lots of carbohydrate supplement for 18 and 24 months, at 100F/80% r.h., 100/57%, 70/80%, 70/57%, 40/57%, and 0F. Two special cases of biscuits from approximately 42 months storage in a GSA common storage warehouse are also reported on. Data include (a) bursting strength, moisture, and general condition of V3c fiberboard cases, (b) corrosion, coating defects, and leakage of 2 1/2-gal. and 5-gal. metal cans, (c) general package and product condition, (d) residual oxygen, fracture strength, moisture, peroxides, and free fatty acids of the wheat products, (e) moisture, pH, and sugars of the supplements, and (f) color, sensory quality and hedonic ratings for all products. (Author)

AD-640 959 **Field 6H**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Div. of Sponsored Research.
AMINO CARBOXYLIC INHIBITION OF LIPID OXIDATION IN DEHYDRATED FOODS.
Final rept. 13 Apr 65-13Apr 66,
by M. Karel, and S. R. Tannenbaum. Sep 66, 65p
Contract DA-19-129-AMC-254 (N)
Proj. DA-1C14501A71C
FD-53, USA-NLABS-TR-67-27-FD

Descriptors: (*Dehydrated foods, *Antioxidants), Amino acids, Inhibition, Oxidation, Degradation, Lipids, Stability, Cellulose, Freeze drying, Fatty acid esters, Military rations.

Identifiers: Methyl linoleates, Histidine.

Oxidation of methyl linoleate was studied in a freeze-dried model system based on microcrystalline cellulose in the presence and in the absence of amino acids. The antioxidant activity of some of the amino acids was found to be highly variable from run to run. In parallel work on conversion products of histidine in the model system, it was demonstrated that a major conversion product of histidine did not contain any substantial amounts of carbon derived from linoleate. In subsequent work it was determined that the conversion of histidine could occur as a result of mixing of the amino acid with the cellulose used in preparation of the model system, or with other types of cellulose including filter paper and cotton. The extent of conversion, however, was quite variable being similar in this respect to the antioxidant activity of the amino acid. Data were inadequate to correlate the conversion of the histidine with its antioxidant activity. However, in two runs in which analysis for the conversion product and oxidation studies were run concurrently it was observed that histidine showed an antioxidant effect when the conversion product was absent, but showed no effect in early oxidation stages, and some pro-oxidant activity in later oxidation stages. In these two runs analysis for the conversion product was carried out after freeze-drying but prior to incubation in air. (Author)

N66-32620 **Field 6H**
CFSTI Prices HC$2.50 MF$0.75
Institute For Biological Research, Los Angeles, Calif.
PHYSIOLOGIC EFFECTS OF DIETARY CLAY SUPPLEMENTS FINAL REPORT, 1 DEC. 1964 - 15 JUN. 1965.
by G. S. Bajwa, and B. H. Ershoff. 19 Jul 65, 72p
NASA-CR-65427
Contract NAS9-3905

Descriptors: *Animal study, *Bone, *Clay, *Growth, Animal, Biology, Calcination, Deficiency, Diet, Effect, Long, Nutrition, Study, Supplement, Weight.

For abstract, see STAR 04 17.

ORO-636 **Field 6H**
CFSTI Prices: HC$2.00 MF$0.50
Louisiana State Univ., Baton Rouge. Dept. of Food Science and Technology.
RADIATION PASTEURIZATION OF SHRIMP AND OYSTERS.
Final summary rept., Jan-Dec 65,
by Arthur F. Novak, and Joseph A. Liuzzo. 15 Jan 66, 28p
Contract AT (40-1)-2951

Descriptors: (*Irradiated foods, Seafood), (*Seafood, Pasteurization).

For abstract, see NSA 20 21.

AD-640 947 See Field 13A

6I. HYGIENE AND SANITATION

N66-32619 **Field 6I**
CFSTI Prices HC$2.50 MF$0.75
General Electric Co., Philadelphia, Pa. Missile And Space Div.
HYDRO- JOHN ENGINEERING PROTOTYPE, THE DESIGN, DEVELOPMENT AND FABRICATION OF A WASTE MANAGEMENT AND WATER RECOVERY SYSTEM.
by L. Cooper, R. Miller, R. W. Murray, and F. Rudek. Oct 64, 92p NASA-CR-65436
Contract NAS9-1301

Descriptors: *Engineering development, *Spacecrew, *Waste disposal, *Water recovery, Ammonia, Bacteria, Control, Development, Disposal, Ecology, Engineering, Management, Prototype, Purification, Recovery, Sanitation, System, Waste, Water.

For abstract, see STAR 04 17.

6K. LIFE SUPPORT

N66-32187 **Field 6K**
CFSTI Prices HC$4.00 MF$1.00
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
EVALUATION AND COMPARISON OF THREE SPACE SUIT ASSEMBLIES.
by R. L. Jones. Jul 66, 142p NASA-TN-D-3482

Descriptors: *Operator performance, *Space suit, *Test program, Data, Design, Function, Interface, Man, Mission, Operation, Operator, Performance, Program, Requirement, Space, Suit, System, Test.

For abstract, see STAR 04 17.

N66-36427 **Field 6K**
CFSTI Prices HC$7.00 MF$1.75
New York Academy Of Sciences, N. Y.
HUMAN ECOLOGY IN SPACE FLIGHT, VOLUME I.
by D. H. Calloway. 1966, 308p NASA-CR-77922
NASA ORDER R-144
Proc. Of The 1st Intern. Interdisciplinary Conf., Princeton, N. J., 13-16 Oct. 1963, Sponsored In Part By Onr

Descriptors: *Acceleration stress, *Conference, *Ecology, *Regenerative cycle, *Space cabin atmosphere, Acceleration, Atmosphere, Biological, Cabin, Chemical, Human, Radiation, Regeneration, Space flight, Stress, System.

For abstract, see STAR 04 22.

N66-36848 **Field 6K**
CFSTI Prices HC$3.00 MF$1.00
Lockheed Missiles And Space Co., Palo Alto, Calif.
DESIGN AND DEVELOPMENT OF A WATER VAPOR ELECTROLYSIS UNIT.
by W. J. Conner, G. M. Cook, and B. M. Greenough. Sep 66, 126p NASA-CR-607
Contract NAS2-2630

Descriptors: *Electrolysis, *Oxygen production, *Water vapor, Acid, Breathing, Cell, Human, Life, Oxygen, Production, Sulfuric, Support, System, Vapor, Water.

For abstract, see STAR 04 22.

N66-37288 **Field 6K**
CFSTI Prices HC$2.50 MF$0.50
Houdry Process And Chemical Co., Philadelphia, Pa. Research And Development Dept.
FEASIBILITY STUDY OF A LOW TEMPERATURE CARBON DIOXIDE REMOVAL SUBSYSTEM, PART II FINAL REPORT.
by E. G. Bauer. Jan 64, 52p NASA-CR-65505, WO-87-0486
Contract NAS9-1782
Its Tech. Rept.-70

Descriptors: *Carbon dioxide removal, *Life support system, *Space cabin atmosphere, Atmosphere, Breathing, Carbon dioxide, Life, Low temperature, Metabolism, Oxygen, Production, Reduction, Removal, Space cabin, Support, System, Waste, Water.

For abstract, see STAR 04 22.

N66-37289 **Field 6K**
CFSTI Prices HC$2.50 MF$0.75
Houdry Process And Chemical Co., Philadelphia, Pa.
INTEGRATED CARBON DIOXIDE REDUCTION SYSTEM FEASIBILITY STUDY, PART I FINAL REPORT.
by J. J. Donovan, and J. D. Potts. 16 Apr 64, 74p
NASA-CR-65504
Contract NAS9-1782

Descriptors: *Carbon dioxide, *Life support system, *Recovery, *Space cabin atmosphere, Atmosphere, Cabin, Life, Metabolism, Oxygen, Reduction, Space, Support, System, Water.

For abstract, see STAR 04 22.

N66-37309 **Field 6K**
CFSTI Prices HC$6.00 MF$1.50
Honeywell, Inc., Minneapolis, Minn. Systems And Research Div.
MAN SYSTEM CRITERIA FOR EXTRATERRESTRIAL ROVING VEHICLES. PHASE IB - THE LUNEX II SIMULATION INTERIM TECHNICAL REPORT.
by J. E. Haaland. 15 Jun 66, 272p NASA-CR-78245
Contract NAS8-20006
Its Rept.-12504- Itr2

Descriptors: *Human performance, *Lunar roving vehicle (lrv), *Physiological response, *Space cabin simulation, Cabin, Design, Evaluation, Lunar, Machine, Man, Measurement, Minimum, Mission, Simulator, Surface, System, Volume.

For abstract, see STAR 04 22.

AD-640 727 See Field 22B

6L. MEDICAL AND HOSPITAL EQUIPMENT

AD-641 017 **Field 6L, 6P**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
DESIGN AND DEVELOPMENT OF AN AUTOMATIC INDIRECT BLOOD PRESSURE MONITORING DEVICE.
Rept. for Feb-Dec 64,
by James E. Allred, and Jack B. Johnson. Sep 66, 14p SAM-TR-66-80
Proj. AF-6320
Task 632001

Descriptors: (*Blood pressure, Monitors), (*Electronic recording systems, Blood pressure), Design, Signal-to-noise ratio, Frequency, Automatic, Exercise.

Identifiers: Korotkov sounds.

The design of an automatic electronic blood pressure recording device is described. This device, which applies pressure only slightly higher than the systolic pressure of the subject, is programed to record the Korotkoff sounds while the occlusion cuff is being inflated. The system may be programed to monitor blood pressure at any predetermined rate from intervals of one minute to several minutes, or it may be initiated manually. Proper design of circuitry for maximum signal-to-noise ratio required a knowledge of the frequency range of the complex Korotkoff sound waveform. This information was obtained by recording the K sounds from four subjects and analyzing the waveforms for energy content vs. frequency. These data are also presented. (Author)

AD-641 120 **See Field 7C**

AD-641 121 **See Field 6P**

6M. MICROBIOLOGY

AD-640 636 **Field 6M, 6O**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Microbial Chemistry, Tokyo (Japan).
EPIDEMIOLOGICAL AND GENETICAL STUDIES ON THE DRUG-RESISTANCE OF SHIGELLAE AND STAPHYLOCOCCI.
Final rept. no. 4, Jun 65-Jun 66,
by Susumu Mitsuhashi. Sep 66, 11p
Contract DA-92-557-FEC-38283
Proj. DA-3A0145 :01A71Q
Task 01039FE
ARDG (FE)-J-183-4
Prepared in cooperation with Bunma Univ., Maebashi (Japan).

Descriptors: (*Antibiotics, Resistance (Biological)), (*Shigella, Resistance (Biological)), (*Staphylococcus, Resistance (Biological)), Epidemiology, Genetics, Drugs, Bacteriophages, Tetracyclines, Penicillins, Escherichia coli, Japan.

Identifiers: Sulfanilamides.

The surveys for the staphylococcal strains, isolated from clinical sources, enclosed the following facts: (1) With reference to four drugs; tetracycline (TC), streptomycin (SM), penicillin G (PC), and sulfanilamide (SA), multiple resistant strains were manifest and they were restricted to specific phage group. (2) It was notified that there are maximum population of resistant strains to some drug in the restricted area, termed as M.P.R. (3) It was found that there are two types of resistant strains: the one becomes resistant easily and multiply when new drug is introduced, the other stays single (SA) or double (PC. SA, SM. SA) resistant. (4) The resistance to TC was easily transduced in high frequencies with the prophages obtained from multiple resistant strains. The resistance to SA and SM was jointly transduced with TC, and vice versa. By contrast, the resistance to PC, i.e., an ability of penicillinase (PCase) formation have never been transduced together with the resistance to TC, SM, and SA. (5) The resistance to macrolide antibiotics (Mac; EM, OM, LM, SP) is eliminated together and irreversively by treatment with acriflavine or by ultraviolet irradiation, and is transduced jointly with phages. From these results, it was concluded that Mac resistance is located on a plasmid, which exists extrachromosomally. (6) It was concluded that gene which governs the formation of PCase is located on a plasmid. Two types of plasmids were found; the one is (Mac. PCase) and the other (PCase). (Author)

AD-641 159 **Field 6M**
CFSTI Prices: HC$3.00 MF$0.75
Naval Medical Research Unit. No. 4, Great Lakes, Ill.
A LABORATORY GUIDE TO THE MYCOPLASMAS OF HUMAN ORIGIN,
by York E. Crawford. Oct 66, 66p RU-66.25
NAVMED-MR-005.09-0024

Descriptors: (*Mycoplasma, Identification), Pleuropneumonia-like organisms, Humans, Etiology, Microbiology, Culture media, Immune serums, Antigens + antibodies, Laboratory equipment, Handbooks, Diagnosis, Diseases, Serodiagnosis.

The manual is intended to assist the laboratory worker who is involved in the isolation and identification of Mycoplasma species of human origin. The preparation of various media, rabbit antisera, complement-fixing antigen, and immunizing antigens are presented as well as incubation technics. The preparation of reagents used for Mycoplasma work are outlined step-by-step. The manual also lists a table of laboratory supplies used in this work and the approximate cost is given. (Author)

N66-30488 **Field 6M**
CFSTI Prices HC$2.00 MF$0.50
Public Health Service, Phoenix, Ariz. Communicable Disease Center.
SERVICES PROVIDED IN SUPPORT OF THE PLANETARY QUARANTINE REQUIREMENTS OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION QUARTERLY REPORT, APR. - JUN. 1966.
24 Jun 66, 41p NASA-CR-76066
NASA ORDER R-137
Its Rept.-14

Descriptors: *Bacteria, *Recovery device, *Spacecraft contamination, Component, Contamination, Device, Glass, Method, Plastics, Sampling, Spacecraft, Sterilization, Technique.

For abstract, see STAR 04 17.

N66-31381 **Field 6M**
CFSTI Prices HC$3.00 MF$0.75
Union Carbide Research Inst., Tarrytown, N. Y.
THE GENERAL AND COMPARATIVE BIOLOGY OF TERRESTRIAL ORGANISMS UNDER EXPERIMENTAL STRESS CONDITIONS SEMI-ANNUAL REPORT.
by S. M. Siegel. 1 May 66, 78p NASA-CR-76409, UCRI-383
Contract NASW-767

Descriptors: *Mars environment, *Organism, *Stress (biol), *Terrestrial radiation, *Ultraviolet light, Ammonia, Animal, Biology, Condition, Environment, Germination, Mars, Microbiology, Oxygen, Permeability, Plant, Radiation, Stress, Survival, Terrestrial.

For abstract, see STAR 04 17.

N66-32145 **Field 6M**
CFSTI Prices HC$1.00 MF$0.50
Taft (Robert A.) Sanitary Engineering Center, Cincinnati, Ohio.
ECOLOGY AND THERMAL INACTIVATION OF MICROBES IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS FIFTH QUARTERLY PROGRESS REPORT, APR. 1 - JUN. 30, 1966.
by R. Angelotti. Jul 66, 22p NASA-CR-76539
NASA ORDER R-36-015-001

Descriptors: *Bacillus, *Spacecraft contamination, Contamination, Dry, Dry heat, Ecology, Encapsulation, Heat, Inactivation, Interplanetary, Lucite, Paper, Spacecraft, Thermal.

For abstract, see STAR 04 17.

N66-32621 **Field 6M**
CFSTI Prices HC$3.75 MF$1.25
Republic Aviation Corp., Farmingdale, N. Y.
EFFECT OF DIET AND ATMOSPHERE ON INTESTINAL AND SKIN FLORA. VOLUME I - EXPERIMENTAL DATA.
by L. S. Gall, and P. E. Riely. 1964, 232p NASA-CR-65437
Contract NAS9-4172

Descriptors: *Atmospheric composition, *Closed ecological system, *Diet, *Human body, *Microbiology, *Microorganism, Atmosphere, Biology, Close, Data, Ecology, Effect, Flora, Human, Hygiene, Intestine, Medicine, Skin.

For abstract, see STAR 04 17.

N66-32622 **Field 6M**
CFSTI Prices HC$3.00 MF$1.00
Republic Aviation Div., Fairchild Hiller Corp., Farmingdale, N. Y.
EFFECT OF DIET AND ATMOSPHERE ON INTESTINAL AND SKIN FLORA. VOLUME II - LITERATURE SURVEY.
by L. S. Gall, and P. E. Riely. 1965, 148p NASA-CR-65438
Contract NAS9-4172

Descriptors: *Bibliography, *Human body, *Microorganism, *Skin (biol), Actinomycetes, Bacteria, Body, Fungus, Human, Literature, Microbiology, Mold, Skin, Survey, Virus, Yeast.

For abstract, see STAR 04 17.

6N. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-640 932 **Field 6N**
CFSTI Prices: HC$2.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
THE STEREOSCOPIC ANGLE AND ITS RELATIONSHIP TO THE STANDARD AIR FORCE TESTS FOR DEPTH PERCEPTION.
Rept. for 1 Nov 65-15 Apr 66,
by Constantine Ricciardi, Benjamin Kislin, and Alton J. Rahe. Aug 66, 27p SAM-TR-66-70
Proj. AF-7755
Task 775509

Descriptors: (*Space perception, Tests), Vision, Physiology, Ophthalmology, Test equipment, Air force personnel, Selection, Aviation medicine.

The three standard Air Force depth perception tests for pilot and observer qualification are the Vision Test Apparatus--Near and Distant (VTA-ND), Verhoeff Stereopter (DPA-V), and Howard-Dolman apparatus (H-D). The stereoscopic angle for the VTA-ND is 25 seconds of arc, 32 seconds for the DPA-V, and 11 seconds for the H-D. An enlarged Verhoeff (SAM-V) was utilized at equivalent calculated distances to compare with the three instruments under their individual parallactic angle conditions. Data analysis showed the following: (1) Employment of the standard criteria for flying qualification resulted in the Verhoeff pass-

ing the greatest number, followed by the VTA-ND, and the H-D. Neither the Verhoeff nor H-D results statistically differed from those of the VTA-ND. (2) The SAM-V generally passed fewer subjects than the corresponding standard tests. The results found with the standard Air Force tests are not a full measure of depth discrimination capability. A test concept is described which would incorporate a dynamic component into depth judgments. (Author)

N66-37282 Field 6N
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla. Naval Aerospace Medical Inst.
INFLUENCE OF CONTACT CUES ON THE PERCEPTION OF THE OCULOGRAVIC ILLUSION.
by B. Clark, and A. Graybiel. 5 Aug 66, 15p
NASA-CR-78269, NAMI-976
NASA ORDER R-93
Joint Rept. With Nasa

Descriptors: *Aerospace medicine, *Oculogravic illusion, *Otolith, *Perception, *Vestibular apparatus, Apparatus, Contact, Cue, Effect, Gravireceptor, Gravitational, Horizontal, Illusion, Medicine, Oculogravic, Rotation, Space, Vestibular, Visual.

For abstract, see STAR 04 22.

AD-640 969 See Field 6E

AD-640 970 See Field 6E

60. PHARMACOLOGY

AD-640 632 Field 6O, 6P
CFSTI Prices: HC$1.00 MF$0.50
Boston Univ., Mass. School of Medicine.
LYMPHATIC ABSORPTION OF DRUGS.
Final scientific rept.,
by Ruth R. Levine. 1 Sep 66, 11p Rept. no. 1179-65-01
Grant AF-AFOSR-914-65
Proj. AF-9777
Task 977701
AFOSR-66-2266

Descriptors: (*Lymphatic system, Drugs), (*Absorption (Biological), Lymphatic system), (*Drugs, Absorption (Biological)), Intestines, Blood, Amino acids, Salicylic acids, Parasympatholytic agents, Diuretics, Ammonium compounds.

Identifiers: Triamaterene, Sulfamerazine.

A survey of the role of the lymphatics in absorption from the gut indicates that these vessels may serve as an accessory route for direct absorption from the gut of some drugs but not others. Lymph was collected from the abdominal portion of the left thoracic duct of the rat, under ether anesthesia, by means of an indwelling catheter, fabricated of polyethylene or silastic tubing. Catheterization was carried out without the necessity of feeding fat, saline or any other fluid. Drugs were administered in solution by intraintestinal or intravenous injection. Following surgery the rat was placed in a specially designed holder, allowed to recover from anesthesia and to freely drink fluid (saline or water). Lymph was collected serially over periods of 3-4 hours or overnight; flow averaged about 2 ml/hr. Blood samples were also taken at appropriate intervals. Concentration of a drug in blood and lymph was' determined by spectrophotometric or isotopic methods, previously shown to be specific for the unchanged drug. The data obtained indicated that the lymphatics are involved in both the absorption and distribution of p-amino salicylic acid. In contrast, the lymphatics appear to play no role in the absorption of quaternary ammonium drug, benzomethamine or that of sulfermerazine and triamterene. (Author)

AD-640 778 Field 6O, 6E
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Medicine.
ISOSORBIDE: DIURETIC EFFECT FOLLOWING ORAL ADMINISTRATION TO NORMAL SUBJECTS,
by Frank J. Troncale, Leroy Shear, James H. Shinaberger, Charles E. Shields, and Kevin G. Barry. 1965, 7p
Availability: Published in The American Journal of the Medical Sciences v251 n2 p99-104 Feb 1966.

Descriptors: (*Diuretics, Effectiveness), Osmosis, Therapy, Urine, Excretion, Toxicity.

Identifiers: Isosorbide.

Urea was administered orally as an osmotic diuretic for treatment of refractory fluid retention by Friedrich over 70 years ago. It has been used intermittently, but has not received widespread application perhaps because of its bitter taste and gastrointestinal intolerance. Currently, urea is administered intravenously to patients for acute reduction of intracranial pressure. Intravenous infusion of mannitol for physiologic studies has been routine since 1940. In recent years, its therapeutic value as an osmotic diuretic has been recognized. Currently it is used extensively in diverse clinical conditions to enhance renal excretion of water and solute. The usefulness of mannitol and urea for acute therapy is established. Their value, however, is limited by the need for intravenous infusion. For chronic therapy an osmotic diuretic which is effective following oral administration may be of value. In the present study of normal human subjects, isosorbide was an effective, nontoxic, osmotic diuretic after oral administration. Therapeutic trial of this agent in patients with refractory fluid retention, therefore, appears warranted. (Author)

AD-640 895 Field 6O, 6T, 15B
Not available from CFSTI.
Defence Chemical Biological and Radiation Labs., Ottawa (Ontario).
CHOLINOLYTICS IN THE TREATMENT OF ANTICHOLINESTERASE POISONING. IV. THE EFFECTIVENESS OF FIVE BINARY COMBINATIONS OF CHOLINOLYTICS WITH OXIMES IN THE TREATMENT OF ORGANOPHOSPHORUS POISONING,
by I. W. Coleman, P. E. Little, G. E. Patton, and R. A. B. Bannard. 27 Sep 65, 21p DCBRL-456A
Availability: Published in Canadian Journal of Physiology and Pharmacology v44 p745-64 1966.

Descriptors: (*Cholinesterase inhibitors, Poisoning), (*Organic phosphorus compounds, *Detoxification), Atropine, Sulfates, Organic compounds, Effectiveness, Chemotherapy, Toxicity, Sarin, Tabun, Dosage, Oximes, Mortality rates, Canada.

The selection, for use in combatting organophosphorus poisoning, of five binary cholinolytic drug combinations from previously screened compounds is described. Their effectiveness was determined in mouse, rat, guinea pig, hamster, and rabbit against TEPP, DFP, Paraoxon, sarin, tabun, O,O-diethyl S-2-diethylaminoethyl phosphorothiolate (DSDP), and cyclohexyl methylphosphonofluoridate (CMPF) in treatments in which the oximes P2S and TMB4 were used both singly and together. The effectiveness of each cholinolytic combination was compared with that of atropine sulfate on the basis of nine quantitative tests and one qualitative test. The following combinations had highest and almost equal effectiveness: G3063, a Caramiphen hydrochloride (Parpanit (Trade name)) analogue, with triflupromazine; and Win 5779-6, a benzilate type ester, with triflupromazine. The combinations of Win 5779-6 with Parpanit (Trade name), atropine methylbromide with Parpanit (Trade name), and G3063 with G5130, another Parpanit (Trade name) analogue, were second in activity and almost equal in potency. Atropine sulfate was the least effective. The most effective oximes were TMB4, and a lower dose mixture of P2S plus TMB4, which were found almost equal in potency but superior in effectiveness to P2S alone. (Author)

AD-641 063 Field 6O
Not available from CFSTI.
Texas Univ., Galveston. Dept. of Pharmacology.
COMPARISON OF SYMPATHECTOMY AND GANGLION BLOCKADE ON PRESSOR RESPONSES TO INCREASED INTRACRANIAL PRESSURE DURING MVO.
Interim rept.,
by Marshall Steinberg, and James G. Hilton. 1966, 3p
Grant AF-AFOSR-391-65
Proj. AF-9777
Task 977701
AFOSR-66-1500
Availability: Published in Fed. Proc. v25 p227 1966.

Descriptors: (*Brain, Blood pressure), (*Autonomic agents, Blood pressure), (*Nerves, Excision), Autonomic nervous system, Atropine, Ganglia, Cerebrovascular system.

Identifiers: Chlorisondamine, Valethamate.

Hilton and Steinberg have reported the chlorisondamine does not completely block the pressor response to increased intracranial pressure (IIP); addition of atropine or valethamate will block the remaining response. Utilizing the major vessel occlusion (MVO) technique of Steinberg and Hilton, studies were performed on dogs to compare the effects of sympathectomy with complete ganglionic blockade. There were no significant differences between the blood pressures of partially sympathectomized dogs (T-1 to L-2) and dogs receiving the drugs. The pressor response in the caudad zone invoked by IIP was significant after sympathectomy. Removal of the inferior mesenteric ganglion reduced this response; however a significant pressor response could be elicited. From the results of this study it has been concluded that the action of chlorisondamine and atropine in blocking the effects of IIP is on or through the sympathetic ganglia. (Author)

AD-641 064 Field 6O
Not available from CFSTI.
Texas Univ., Galveston. Medical Branch.
CAROTID SINUS OCCLUSION RESPONSE IN THE PRESENCE OF CHLORISONDAMINE AND ATROPINE,
by Marshal Steinberg, and James G. Hilton. 20 Jul 65, 3p
Grant AF-AFOSR-391-63
Proj. AF-9777
Task 977701
AFOSR-66-1470
Availability: Published in Journal Texas Report Biol. Med v23 p667 1965.

Descriptors: (*Autonomic agents, Arteries), Blood pressure, Vasoactive agents, Reflexes, Chemoreceptors, Atropine, Dosage, Obstruction (Physiology), Ganglia.

Identifiers: Chlorisondamine.

Classical ganglionic blocking agents such as chlorisondamine (1 mg/Kg) fail to block completely the pressor response of carotid sinus occlusion in dogs. The pressor response is obliterated by the injection of 1 mg/Kg of atropine after the chlorisondamine (Ecolid) has been given. Systemic blood pressure is lowered when chlorisondamine is injected and further reduced after the administration of the atropine. Piperocaine hydrochloride, 1.5% (20 cc introthecally) given after the two above mentioned agents significantly lowered the post blockade blood pressure. A major vessel occlusion was performed caudal to the renal arteries (Hilton modification of Bartelstone, Circ. Res., 8: 1059, 1960.). Blood pressure was monitored from the femoral artery, brachial artery and femoral vein, using a Statham Transducer and a Grass

Polygraph. Results indicate that there is a component of the ganglia which is 'muscarinic' in response, which agrees with recent publications. This report is a part of a study of vasopressor reflexes under the influence of autonomic agents. (Author)

PB-173 248 **Field 6O, 6T**
CFSTI Prices: HC$3.00 MF$0.75
Hazleton Labs., Inc., Falls Church, Va.
REPEATED ORAL AND INTRAVENOUS ADMINISTRATION OF CYTOSINE ARABINOSIDE TRIACETATE TO MALE AND FEMALE RHESUS MONKEYS,
by Howard Feinman, Thomas W. Tusing, Elton R. Homan, and David P. Rall. 24 Aug 66, 81p Rept. no. 194
Contract PH43-63-1168

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Pathology, Hematology, Dosage, Blood chemistry, Histology, Biopsy, Behavior, Appetite, Excretion, Body weight, Bone marrow, Toxic tolerances, Monkeys.

Identifiers: Cytosine arabinoside triacetate.

PB-173 249 **Field 6O, 6T**
CFSTI Prices: HC$3.00 MF$0.75
Hazleton Labs., Inc., Falls Church, Va.
REPEATED INTRAVENOUS AND ORAL ADMINISTRATION OF DIMETHYL SULFOXIDE IN RHESUS MONKEYS,
by Howard Feinman, Thomas W. Tusing, Elton Homan, and David P. Rall. 15 Apr 66, 64p Rept. no. 181
Contract PH43-63-1168

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Sulfoxides, Pathology, Hematology, Dosage, Blood chemistry, Histology, Behavior, Appetite, Excretion, Biopsy, Body weight, Toxic tolerances, Monkeys.

Identifiers: Dimethyl sulfoxide.

PB-173 250 **Field 6O, 6T**
CFSTI Prices: HC$3.00 MF$0.50
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
COMPARATIVE LEUCOPENIC EFFECT OF DAILY AND INTERMITTENT DOSE REGIMEN,
by Nathan Rakieten, David A. Cooney, and Ruth D. Davis. 21 Jul 66, 52p
Contract PH43-64-932

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Leukocytes, Blood platelets, Anemias, Pathology, Hematology, Dosage, Blood chemistry, Medical examination, Bone marrow, Toxic tolerances, Dogs.

Identifiers: Dimethyltriazeno imidazole carboxamides.

PB-173 308 **Field 6O, 6T**
CFSTI Prices: HC$1.00 MF$0.50
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
STUDIES ON THYROID FUNCTION, P. B. I. AND PROTHROMBIN TIME OF MONKEYS TREATED WITH REPEATED DOSES OF NSC 45388, IMIDAZOLE-4 (OR 5)- CARBOXAMIDE, 5 (OR 4)3,3-DIMETHY1-1-TRIAZENO),
by Nathan Rakieten, David A. Cooney, and Ruth D. Davis. 22 Aug 66, 17p
Contract PH-43-64-932

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Dosage, Pathology, Prothrombin, Hypothermia, Thyroid gland, Leukocytes, Anemias, Blood platelets, Blood diseases, Histology, Monkeys.

Identifiers: Dimethyltriazeno imidazole carboxamides, Protein-bound iodine.

Compound NSC 45388, Imidazole-4 (or 5)-carboxamide, 5 (or 4)-3,3-dimethy1-1-triazeno)when administered to monkeys at a dose of 60 mg/kg/day (780 mg/M sq/day) was lethal to the animals after five and ten doses. These studies were initiated primarily to determine whether or not drug administration would produce alterations in P.B.I. and prothrombin time of the animals. In one of two animals (No. 101F) there was a terminal decrease in P.B.I. associated with a hypothermia, and in the other animal (No. 102M) there was a questionable decrease in P.B.I. terminally also associated with hypothermia. These changes did not occur during drug treatment but only occurred at the time the animals were moribund or in poor condition. On microscopic examination no abnormal findings were noted in the thyroids. In contrast during drug treatment leucopenia, anemia and thrombocytopenia were noted. In neither animal was there any change in the prothrombin time. Since the alterations in P.B.I. were associated with an agonal condition of the animals and there were no definitive histological changes in the thyroids the evidence would indicate that the alterations in P.B.I. were not unequivocally drug related. (Author)

PB-173 334 **Field 6O, 6T**
CFSTI Prices: HC$1.00 MF$0.50
Mason Research Inst., Worcester, Mass.
A COMPARISON OF LD50 VALUES OF NOGALAMYCIN ADMINISTERED TO MICE BY THE INTRAPERITONEAL AND THE INTRAVENOUS ROUTES.
Research rept.,
by Zareh Hadidian. 28 Sep 66, 3p
Contract PH43-65-51

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Parenteral infusions, Dosage, Toxic tolerances, Mice, Mortality rates.

Identifiers: Nogalamycins.

The object of this study was to determine whether Nogalamycin is more toxic by the intraperitoneal than the intravenous route. The results show definitely that the compound was more toxic by the intraperitoneal route. The LD50 of 11.75 mg/kg with 95% confidence limits of 10.02-13.78 obtained in this study by the intravenous route is in reasonable agreement with the value obtained earlier (8.7 mg/kg: 95% C.L. 7.7-9.9). The LD50 of 4.79 mg/kg with 95% confidence limits of 3.86-5.49 is significantly lower than both. By both routes of administration, 60% of deaths occurred on days 3, 4 and 5. Among the animals examined there was perhaps a little more fluid in the peritoneal cavity of those injected intraperitoneally; but in either case there was very little fluid-perhaps 2-3 drops. No massive intestinal hemorrhage was observed.

AD-640 636 **See Field 6M**

AD-640 910 **See Field 6A**

6P. PHYSIOLOGY

AD-425 634 **Field 6P**
CFSTI Price: HC$3.60
Ohio State Univ., Columbus. Dept. of Medicine.
THE EFFECTS OF PSYCHOMOTOR AROUSAL, HEMORRHAGE, AND THE UPRIGHT POSTURE ON THE CIRCULATION OF THE YOUNG CHIMPANZEE.
Technical documentary rept.,
by Arnold M. Weissler, Clyde D. Schoenfeld, Vernon L. Carter, Sidney Cohen, and James 7. Warren. Dec 63, 32p
Contract AF 29 (600)-3468
ARL-TDR-63-28

Descriptors: (*Cardiovascular system, Physiology), Blood circulation, Hemorrhage, Posture, Stress (Psychology), Primates, Cardiography, Statistical data, Blood pressure.

Standard techniques of cardiac catherization and the indicator dilutiwn method for cardiac output were made in the young chimpanzee. Determinations of pressure in the pulmonary and systemic circulation and cardiac output were obtained with the animals at rest in the supine position and during the altered hemodynamic states accompanying psychomotor arousal, hemorrhage and head-up tilt. All studies were performed without pharmacologic preparation of the animals. Comparison of the circulation of the chimpanzee with that in the human demonstrated a tendency for heart rate. Cardiac output and arterial pressure to be higher while pressures in the pulmonary circulation were in a range similar to that in the human of comparable size and age. These observations demonstrate that the chimpanzee is a convenient laboratory primate for hemodynamic studies in whom circulatory responses can be observed with techniques commonly employed in the human. (Author)

AD-469 585 **Field 6P, 6O**
CFSTI Prices: HC$2.60 MF$0.50
Chicago Univ., Ill.
STUDY OF MONKEY, APE, AND HUMAN MORPHOLOGY AND PHYSIOLOGY RELATING TO STRENGTH AND ENDURANCE. PHASE IX. THE STRENGTH TESTING OF FIVE CHIMPANZEE AND SEVEN HUMAN SUBJECTS.
Final rept.,
by William E. Edwards, and Thomas Erskine Clarke. Aug 65, 29p
Contract AF 29 (600)-3466
Proj. AF-6892
Task 689201
ARL-TR-65-15

Descriptors: (*Chimpanzees, Strength), (*Physical fitness, Humans), Performance (Human), Physiology, Muscles, Test methods, Anthropometry, Anatomy, Fatigue (Physiology), Endurance.

Five chimpanzees (two immature of each sex and one adult male) were trained for testing of elbow flexion strength. Resulting scores were compared with those of seven young (20 to 37 years) adult human males. The apes mainfested a 2-1/2 fold superiority by body-weight and, sex and age equivalent, an appreciable superiority by brachial cross-sectional area. (Author)

AD-640 555 **Field 6P**
CFSTI Prices: HC$2.00 MF$0.50
Kansas State Univ., Manhattan. Dept. of Psychology.
SENSITIVITY AND SPECTRAL RESPONSE PROPERTIES OF HUMAN VISION AT LOW LUMINANCES.
Technical rept. on Study of Visual Perception in Humans and Animals,
by John Lott Brown. Oct 66, 31p TR-2
Contract Nonr-3634 (04)

Descriptors: (*Vision, Adaptation (Physiology)), (*Visual acuity, Photosensitivity (Biological)), Thresholds (Physiology), Illumination.

The sensitivity of human vision is considered in relation to level of adaptation, luminance and spectral distribution of available light and the visual tasks to be performed. The relevance of these considerations to aided and unaided vision at low luminances is discussed. (Author)

AD-640 714 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Univ., Cambridge, Mass. Biological Labs.
FINAL REPORT, OCTOBER 6, 1966,
by George Wald. 6 Oct 66, 5p
Contract Nonr-1866 (38)

Descriptors: (*Color vision, Eye pigments), Retina, Measurement, Adaptation (Physiol-

ogy), Arthropods, Vision, Eye, Electrophysiology, Photosensitivity (Biological), Chromosomes, Amino acids.

AD-640 826 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
DECREASE OF METABOLIC RATE IN CHRONICALLY HYPOTHERMIC CATS WITH PREOPTIC LESIONS,
by F. H. Jackson, and Russell D. Squires. 20 Sep 66, 13p NADC-MR-6616
Task R360-FR102/2021/RO1-101-01

Descriptors: (*Hypothermia, Metabolism), (*Heat production (Biology), Brain), (*Body temperature, Control), Oxygen consumption, Nervous system, Shivering, Cats.

The oxygen consumption and evaporative water loss rates of unrestrained cats were measured at ambient temperatures of 23 to 24C before and after ablation of the medial preoptic region. Postoperative rates were measured after postoperative weight loss had been regained by the hypothermic cats. The mean change of oxygen consumption per kilogram (-17.3%) was significant at the 2% level. The coefficient of correlation between decrease in metabolic rate and final colonic temperature reached was 0.94 ($p<0.02$). Evaporative water loss rate was not changed significantly ($p<0.4$). The decrease in metabolic rate is explained as due to ablation of 'hypothermia detectors' in the medial preoptic region which normally drive metabolism to prevent hypothermia at comfortable ambient temperature. (Author)

AD-640 860 **Field 6P, 9C**
CFSTI Prices: HC$3.00 MF$0.75
Keele Univ. (England). Dept. of Communication.
NEW METHODS OF ANALYSIS OF ELECTROPHYSIOLOGICAL RESPONSES.
Final scientific rept.,
by Donald M. MacKay, D. Aled Jeffreys, and Richard R. Glover. 30 Jun 66, 87p
Grant AF-EOAR-18-65
Proj. AF9777
Task 977701
AFOSR-66-2337

Descriptors: (*Vision, Electroencephalography), (*Electroencephalography, Analysis), Pattern recognition, Magnetic tape, Pulse frequency modulation, Electrophysiology.

The report is a continuation of the work described in Reports AD-278 590 and AD-416 363. A simple 4 channel averaging system using a form of PFM for signal recording and a closed loop of magnetic tape as the accumulator is described and the experimental results of its application to the study of human evoked responses to patterned visual fields reported. The use of simple pulse coincidence circuitry for cross-correlation of E.E.G. signals is summarized. (Author)

AD-640 861 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Centre d'Etudes de Physiologie Nerveuse et d'Electrophysiologie, Paris (France).
NERVOUS PROCESSES UNDERLYING BEHAVIOR AND LEARNING.
Final scientific rept. 1 May 65-30 Apr 66,
by A.-E. Fessard. 30 Apr 66, 17p
Grant AF-EOAR-34-65
Proj. AF-9777
Task 977701
AFOSR-66-2356
Continuation of Grant AF-EOAR-13-63. See also AD-627 894.

Descriptors: (*Electrophysiology, *Behavior), (*Central nervous system, Behavior), (*Learning, Electrophysiology), Brain, Sleep, Neurology, Nerve cells, Neuromuscular transmission, Rats, Monkeys, France.

An analytical study of communication structures and basic mechanisms which will provide a better understanding of how the brain controls well-defined performances of animal behavior. Material is categorized under the headings: animal behavior, cerebral physiology, and cellular processes.

AD-640 889 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Edgewood Arsenal, Md. Medical Research Lab.
THE ADRENAL RESPONSE OF HAMSTERS, GERBILS, AND RATS TO EXOGENOUS ADRENOCORTICOTROPIN OR UNILATERAL ADRENALECTOMY.
Technical rept.,
by Paul F. Robinson, and Russel J. Reiter. Oct 66, 14p
Proj. DA-1L013001A91A02
EATR-4055

Descriptors: (*Adrenal glands, Excision), (*Adrenocorticotropic hormone, *Rodents), Ascorbic acid, Cholesterol, Hamsters, Rats.

Identifiers: Gerbils.

A comparative study was carried out on three species of rodents in order to determine in each case whether or not adrenocorticotrophic hormone (ACTH) of either exogenous or endogenous origin depletes the cortical store of ascorbic acid and of cholesterol. Either unilateral or sham adrenalectomy caused a marked decrease in the ascorbic acid content of the remaining adrenal gland of the rat. An even greater decrease in this constituent was obtained 1 hour after the administration of 10 international units (IU) of ACTH. Rat adrenal cholesterol was somewhat less responsive to the above treatment. Unilateral or sham adrenalectomy had no significant effect on adrenal ascorbic acid or cholesterol in the hamster. Twenty IU of ACTH caused a 20% drop in hamster adrenal cholesterol; whereas, 10 IU did not. The response of the Mongolian gerbil to ACTH or adrenalectomy, either unilateral or sham, was approximately the same as that of the rat. (Author)

AD-640 890 **Field 6P**
CFSTI Prices: HC$2.00 MF$0.50
Edgewood Arsenal, Md. Medical Research Lab.
THE ROLE OF THE PINEAL GLAND AND OF ENVIRONMENTAL LIGHTING IN THE REGULATION OF THE ENDOCRINE AND REPRODUCTIVE SYSTEMS OF RODENTS.
Technical rept.,
by Russel J. Reiter, Roger A. Hoffman, and Ralph J. Hester. Oct 66, 44p
Proj. DA-1C014501B71A02
EATR-4032

Descriptors: (*Photoperiodism, Reproduction (Physiology)), (*Endocrine glands, Reproduction (Physiology)), Rodents, Reproductive system, Eye, Excision, Testes, Ovaries, Adrenal glands, Thyroid gland, Iodine, Thiourea, Rats, Hamsters.

Identifiers: Pineal gland.

Studies were performed to determine whether the pineal gland and the photoperiod play an important role in the regulation of certain endocrine and reproductive functions of rats and hamsters. A specially designed instrument is described that simplifies and speeds removal of the pineal glands. The major conclusions are: Exposure of hamsters to short daily photoperiods (1 to 2 hr/day) or removal of the eyes results in atrophy of the reproductive organs. Pinealectomy prevents this atrophy. Removal of one testis from a dark-exposed hamster prevents gonadal atrophy attendant on short daily photoperiods. The degree of compensatory adrenal enlargement following unilateral adrenalectomy in female albino rats kept in long or short daily photoperiods is similar. This response is not altered by removal of the pineal gland. (Author)

AD-640 985 **Field 6P**
CFSTI Prices: HC$3.00 MF$0.75
Siena Univ. (Italy). Istituto di Patologia Medica.
BRAIN STEM SYSTEMS AND BEHAVIOR.
Final scientific rept. 1 Jun 65-31 May 66,
by Cesare Bartorelli, and Alberto Zanchetti. Jul 66, 65p
Grant AF-EOAR-6-65
Proj. AF-9777
Task 977701
AFOSR-66-2413
See also AD-623 798.

Descriptors: (*Central nervous system, *Behavior), (*Sleep, *Blood pressure), Brain, Emotions, Anatomy, Physiology, Nervous system, Cardiovascular system, Reflexes, Electrophysiology, Chemoreceptors, Pathology, Hypertension, Hypotension, Arteries, Blood circulation, Heart, Cats, Italy.

Identifiers: Sham rage behavior.

Research was performed: (1) on central and reflex regulation of emotional behavior; and (2) on central and reflex regulation of circulation during the wakefulness-sleep cycle. (Author)

AD-641 016 **Field 6P, 6S**
Not available from CFSTI.
School of Aerospace Medicine, Brooks AFB, Tex.
AUTO- AND CROSS-CORRELATION OF THE EEG FOLLOWING UNILATERAL CALORIC STIMULATION OF THE LABYRINTH.
Final rept., Jun 64-Feb 66,
by E. Liske, Harry M. Hughes, and Darwell E. Stowe. Aug 66, 14p SAM-TR-66-76
Proj. AF-7752
Task 775503

Descriptors: (*Vestibular apparatus, *Electroencephalography), Correlation techniques, Stimulation, Ear, Nystagmus, Stress (Physiology).

Identifiers: Irrigation (Medicine).

Twenty-eight neurologically and medically normal Air Force males between the ages of 18 and 23 years underwent unilateral caloric stimulation of the labyrinth while the brain waves were monitored by the electroencephalograph. In addition, eye movements were recorded by electro-oculograph, and all bioelectric signals were recorded in FM mode on magnetic tape. The brain waves were then digitized and analyzed on digital computer with an auto- and cross-correlation program. The results of the study show that unilateral caloric stimulation of the labyrinth has no significant effect on the alpha activity generators on either side of the brain. Further, those neuronal circuits responsible for maintaining calorically induced nystagmus do not significantly alter those neuronal circuits which generate alpha activity. Lastly, no phase shift between bilateral alpha activity could be induced by the unilateral caloric stimulation of the labyrinth. (Author)

AD-641 028 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Lund Univ. (Sweden). Dept. of Pharmacology.
A STUDY OF THE CHEMICAL SENSITIVITY OF SKELETAL MUSCLE.
Final scientific rept.,
by S. Thesleff. 30 Jun 66, 21p
Grant AF-EOAR-35-65
Proj. AF-9777
Task 977701
AFOSR-66-2415

Descriptors: (*Muscles, *Phospholipids), (*Musculoskeletal system, Electrophysiology), (*Clostridium perfringens, Enzymes), Chemoreceptors, Acetylcholine, Sensitivity, Electrolytes (Physiology), Permeability, Ions, Sweden.

Phospholipase C from C1. Welchii has been observed to selectively block the action potential generating mechanism in the muscle membrane by splitting phosphorylcholine from membraneous lecithin. (Author)

AD-641 031 **Field 6P**
Not available from CFSTI.
Goteborg Univ. (Sweden). Inst. of Neurobiology.
RHYTHMIC ENZYME CHANGES IN NEURONS AND GLIA DURING SLEEP,
by H. Hyden, and P. W. Lange. 19 Apr 65, 5p
Grant AF-EOAR-28-63
Proj. AF-9777
Task 977701
AFOSR-66-2451
Availability: Published in Science v149 n3684 p654-6 Aug 6 1965.

Descriptors: (*Sleep, *Nervous system), (*Enzymes, *Nerve cells), Rabbits, Ganglia, Rhythm (Biology), Metabolism, Sweden.

Identifiers: Wakefulness.

Rhytmic changes occur in the activities of enzymes in both the neurons and neuroglia isolated from the caudal part of the reticular formation of rabbits killed during sleep and wakefulness. During sleep, enzyme activity is high in the neurons and low in glia; during wakefulness, this situation is reversed. In the oral part of the reticular formation rhythmic enzyme changes occur only in the neurons. No rhythmic changes occur in the hypoglossal and trigeminal mesencephalic neurons and glia. These findings indicate that the caudal part of the reticular formation reflects in metabolic changes the biological clock behind the sleep rhythm. (Author)

AD-641 057 **Field 6P, 5J**
Not available from CFSTI.
Florida Univ., Gainesville. Dept. of Psychology.
SLEEP: EFFECTS OF A RESTRICTED REGIME,
by Wilse B. Webb, and H. W. Agnew, Jr. 4 Oct 65, 6p
Grant AF-AFOSR-395-65
Proj. AF-9778
Task 977801
AFOSR-66-1149
Availability: Published in Science v150 n3704 p1745-7 Dec 24 1965.

Descriptors: (*Sleep, Inhibition), Electroencephalography, Performance tests, Statistical analysis.

Identifiers: Sleep deprivation.

Eight young male subjects were permitted to sleep only 3 hours out of each 24 for eight days. Electroencephalographic recordings were made during each sleep period. During the restricted sleep subjects did not miniaturize their sleep but rather they continued to show a sleep pattern consistent with the first 3 hours of normal nighttime sleep. There was an increase in Stage IV sleep during the restricted period. On a recovery night the first 6 hours of sleep also showed a significant increase in deep sleep. (Author)

AD-641 059 **Field 6P**
Not available from CFSTI.
Western Reserve Univ., Cleveland, Ohio. Dept. of Physiology.
EFFECT OF CAROTID CHEMORECEPTOR STIMULATION ON PLASMA ANTIDIURETIC HORMONE TITER,
by Leonard Share, and Matthew N. Levy. 21 Jun 65, 7p Rept. no. 100
Grants AF-AFOSR-692-65, PHS-HE-06035-03
Proj. AF-9777
Task 977701
AFOSR-66-0837
PHS-HE-05460-04
Availability: Published in The American Journal of Physiology v210 n1 p157-61 Jan 1966.

Descriptors: (*Pituitary hormones, Secretion), (*Chemoreceptors, *Arteries), Stimulation, Blood pressure, Levarterenol, Dogs.

Identifiers: Antidiuretic hormone.

Experiments have been performed in anesthetized dogs to evaluate the role of the carotid chemoreceptors in the regulation of the plasma concentration of antidiuretic hormone (ADH). Chemoreceptor stimulation was achieved by perfusion of an isolated carotid sinus with deoxygenated blood. Carotid chemoreceptor stimulation in dogs breathing spontaneously was without a statistically significant effect on the plasma ADH titer. However, in vagotomized, open-chest, artificially ventilated dogs, chemoreceptor stimulation resulted in an increase in the plasma ADH level. This effect appeared to be greater when mean arterial blood pressure was prevented from rising by bleeding from an artery during the period of chemoreceptor stimulation. The bleeding per se did not appear to contribute to the response, since in experiments in vagotomized, artificially ventilated dogs which l-norepinephrine was infused intravenously, bleeding to hold mean arterial pressure constant was without effect on the plasma concentration of ADH. It is concluded that stimulation of the carotid chemoreceptors results in an increased release of ADH. (Author)

AD-641 121 **Field 6P, 6L, 11A**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
IN VIVO DEGRADATION OF RADIOACTIVE C14 BUTYL CYANOACRYLATES IN RATS (30 DAYS).
Technical rept.,
by K. C. Pani, Gary Gladieux, and Harold Lange. Aug 66, 10p TR-6615
Proj. 3A014501B71P

Descriptors: (*Adhesives, Metabolism), (*Implants, Degradation), (*Acrylic resins, Metabolism), (*Nitriles, Metabolism), Tracer studies, In vivo analysis, Excretion, Radioactive isotopes, Esters, Tissues (Biology).

Identifiers: Butyl cyanoacrylates, Cyano acrylates, Tissue adhesives.

N-Butyl-2-cyanoacrylate is another of the family of cyanoacrylate tissue adhesives. It has proven to be as good an adhesive as methyl-2-cyanoacrylate, but much less histotoxic. It is known that methyl-2-cyano-acrylate is completely degraded in the rat and excreted via the urine, feces, and probably the lungs. This study is designed to investigate the manner and extent to which butyl-2-cyanoacrylate is degraded and excreted from rat implant sites. (Author)

AD-641 173 **Field 6P**
Not available from CFSTI.
Utah Univ., Salt Lake City. Dept. of Physiology.
SYMPATHETIC ACTIVITY AND THE SYSTEMIC CIRCULATION IN THE SPINAL CAT,
by A. Fernandez de Molina, and E. R. Perl. 16 Feb 65, 24p
Grant AF-AFOSR-748-65
Proj. AF-9777
Task 977701
AFOSR-66-1459
Availability: Published in J. Physiol. v181 p82-102 1965.

Descriptors: (*Autonomic nervous system, *Blood circulation), Reflexes, Electrophysiology, Cardiovascular system, Blood pressure, Nerve cells, Ganglia, Blood pressure, Spinal cord, Nerve impulses, End organs, Cats.

A description is given of a series of experiments in the spinal cat whose purpose was to relate reflex and background discharge of sympathetic preganglionic neurones to the systemic circulation. Reflex discharges evoked by single afferent volleys in spinal nerves usually appeared in only certain post-ganglionic branches of the stellate and upper lumbar ganglia. A number of types of stimuli which reflexly excite preganglionic neurones evoked transient increases in the systemic arterial pressure, and/or altered flow in the femoral, inferior mesenteric and brachial arteries. Afferent fibers associated with reflex variations in arterial flow conducted between 10 and 25 m/sec, the same range of velocities as those evoking preganglionic reflexes. With one exception, the heart rate was not observed to vary during reflex increases in systemic pressure. Variations in systemic arterial pressure or arterial flow were sometimes autogenous with long-term and regular cycles (25-60 sec) which often could be blocked by tetraethyl ammonium. In several preparations, periodic fluctuations in preganglionic discharge were temporally related to periodic fluctuations in the systemic arterial pressure and both were altered by changes in haemodynamics. It was concluded that in the spinal cat: the distribution of preganglionic impulses is specific in terms of effector organs and demonstrates independent control of some portions of the sympathetic outflow; cycling of the systemic arterial pressure with its relation to sympathetic activity indicates some form of vasomotor control at the spinal level. (Author)

N66-30746 **Field 6**
CFSTI Prices HC$3.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla. Naval Aerospace Medical Inst.
A STANDARD TECHNIQUE FOR TEMPORAL BONE PREPARATION JOINT REPORT.
by M. Igarashi. 2 Mar 66, 52p NASA-CR-76281
NASA ORDER R-93
Its Monograph-13

Descriptors: *Ear, *Histology, *Otology, End, Function, Inner, Labyrinth, Morphology, Organ, Pathology, Preparation, Specimen.

For abstract, see STAR 04 17.

N66-30789 **Field 6**
CFSTI Prices HC$5.00 MF$1.25
National Aeronautics And Space Administration, Washington, D. C.
OXYGEN UTILIZATION OF THE ORGANISM AND ITS REGULATION.
by N. A. Agadzhanyan. Jun 66, 205p NASA-TT-F-420
Transl. into English Of"kislorodnyy Rezhim Organizma I Yego Regulirovaniye" (Kiev) Kiyevskaya Knizhnaya Tipografiya, 1965 Abstracts Of Papers Presented At A Symp. Held In Kievkanev, 24-29 May 1965

Descriptors: *Abstract, *Oxygen metabolism, Altitude, Animal, Biological, Human, Mammal, Mechanism, Metabolism, Organism, Oxidation, Oxygen, Physiology, Regulation.

For abstract, see STAR 04 17.

N66-31162 **Field 6**
CFSTI Prices HC$2.00 MF$0.50
Teledyne Systems Corp., Hawthorne, Calif.
ELECTRICAL RESISTANCE OF THE SKIN.
2 Nov 64, 28p NASA-CR-57212
Contract NAS4-566
Prepared For Spacelabs, Inc.

Descriptors: *Electric resistance, *Physiology, *Skn (biol), Alternating, Biology, Circuit, Current, Direct, Electric, Electrode, Function, Gland, Impedance, Measurement, Model, Path, Resistance, Structure, Sweat.

For abstract, see STAR 04 17.

N66-32265 **Field 6**
CFSTI Prices HC$1.00 MF$0.50
Harvard Univ., Boston, Mass. Thorndike Memorial Lab.

A STUDY OF PHYSIOLOGICAL MECHANISMS AND INTER-RELATIONS BETWEEN SYSTEMIC AND REGIONAL BLOOD VOLUME, BLOOD FLOW AND ELECTROLYTE BALANCE INTERIM PROGRESS REPORT.
by W. H. Abelmann, and L. E. Earley. 30 Jun 66, 10p NASA-CR-76667
Grant NSG-595

Descriptors: *Blood flow, *Electrolyte, *Hemodynamic response, Absorption, Animal, Arteriosclerosis, Balance, Blood, Circulation, Excretion, Failure, Fibrillation, Flow, Heart, Hemodynamic, Interrelationship, Mechanism, Perfusion, Physiology, Pressure, Region, Renal, Response, Sodium, System, Volume.

For abstract, see STAR 04 17.

N66-37208 **Field 6P**
CFSTI Prices HC$2.00 MF$0.50
Illinois Univ., Urbana. Dept. Of Physiology And Biophysics.
THE PHYSICAL AND CHEMICAL PROPERTIES OF HUMAN SWEAT AND FACTORS AFFECTING THE WATER BALANCE IN CONFINED SPACES SEMIANNUAL STATUS REPORT NO. 2, 1 JAN. - 30 JUN. 1966.
by R. E. Johnson, and F. Sargent. 1966, 46p
NASA-CR-78121
Contract NGR-14-005-050

Descriptors: *Chemical property, *Physical property, *Sweating, *Water balance, Acid, Balance, Base, Chemical, Collection, Composition, Density, Enclosed, Freezing, Gland, Human, Osmosis, Perspiration, Physical, Point, Pressure, Processing, Property, Secretion, Space, Sweat, Viscosity, Water.

For abstract, see STAR 04 22.

AD-640 571 **See Field 17B**

AD-640 632 **See Field 6O**

AD-640 850 **See Field 5J**

AD-641 017 **See Field 6L**

AD-641 289 **See Field 6A**

6Q. PROTECTIVE EQUIPMENT

AD-428 073 **Field 6Q**
CFSTI Price: HC$2.00
Test Squadron (Operational) (4750th), Tyndall AFB, Fla.
OPERATIONAL TEST AND EVALUATION OF PHOTOTROPIC GOGGLES.
Final rept.,
by Donald J. Parkhurst. 13 Nov 63, 27p
Proj. ADC/73AD/63-26

Descriptors: (*Eyeglasses, *Flashblindness), Retina, Burns, Nuclear explosions, Flight crews, Oxygen masks, Helmets, Ultraviolet filters, X-ray filters, Air force equipment, Safety devices, Performance tests.

For many years the Air Force has examined various systems designed to prevent retinal burns while directly viewing a nuclear detonation. The Irreversible Phototropic Filter Device is one of many such systems. Forty-nine Air Defense Command and twenty-four Tactical Air Command aircrews evaluated the compatibility of goggle frames with present equipment and the feasibility of carrying extra lenses for in-flight changes. The qualitative evaluation indicated that: The goggles do not integrate with the oxygen mask, helmet and visor; It is not practicable to carry additional phototropic lenses for in-flight changes. The Irreversible Phototropic Filter Device is operationally unacceptable for use by aircrew members. Recommend that ASD continue efforts to develop a suitable device for flashblindness protection. (Author)

6R. RADIOBIOLOGY

AD-640 546 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
EFFECT OF X-RADIATION ON THE GROWTH AND DIVISION PROCESS OF TETRAHYMENA PYRIFORMIS,
by P. Schmid. 12 Sep 66, 24p USNRDL-TR-1070
NAVMED-MR005.08-0012

Descriptors: (*Ciliata, Cell division), (*Radiation effects, *Cell division), X rays, Desoxyribonucleic acids, Biosynthesis, Cells (Biology), Growth, Thymidines, Tritiated compounds.

Identifiers: Tetrahymena.

Shortly after the beginning of x-irradiation a division block was imposed on exponentially replicating cells of Tetrahymena pyriformis and thereafter no cell division was observed for several hours. However, following x-irradiation Tetrahymena grew exponentially and increased in volume. The volume distribution of control and x-irradiated culture was lognormal. Furthermore, small cells originating from cells at the beginning of the division cycle grew at the same rate as large cells originating from cells which were close to division. This indicates that cell growth is independent of the cell division cycle to a significant extent. X-irradiation caused a temporary inhibition of the incorporation of tritiated thymidine into the DNA of cells, but Dna synthesis was resumed during irradiation, followed exponential kinetics even after x-irradiation was discontinued and stopped shortly before synchronous division. Thus, some biochemical adaptation of DNA synthetic mechanisms takes place during irradiation. (Author)

AD-640 614 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
EFFECTIVENESS OF SMALL EXTERNAL EPICONDYLAR LEAD CUFFS AGAINST LETHAL X-RADIATION IN DOGS,
by Leonard J. Cole, Henry M. Haire, and Edward L. Alpen. 19 Oct 66, 28p USNRDL-TR-1068
Proj. DA-3A-025601-A824-OSG
NAVMED-MR005.08-0006, NAVMED-MR005.08-0015

Descriptors: (*X rays, Shielding), (*Shielding, Bone), (*Hemopoietic system, Shielding), Radiological dosage, Lead, Bone marrow, Lethal dosage, Effectiveness, Survival, Dogs.

Dogs were exposed to 250 kvp X radiation while bearing a small external lead shield (weighing about 600 grams) around the limb epicondyle. Such shielding permitted survival after otherwise lethal doses up to 1000 R (a dose approximately 3 times the LD50). The protection was characterized by a critical recovery in the peripheral leucocyte counts usually observable by 12 days postirradiation. A single lead cuff was also effective against a 600 R dose of 1 Mvp X rays but not after 800 R. However, protection against mortality was evident at this radiation dose when double or triple layers of lead shield were employed. Attenuation of the radiation dose under these conditions was measured by means of lithium fluoride dosimeters appropriately placed under the lead cuff and also on a dog phantom. The theoretical basis for the findings is discussed in terms of critical functional repopulation of peripheral hemopoietic and lymphoid tissue sites via cellular seeding from the shielded marrow. It is suggested that such shielding may be practically feasible under certain military and medical circumstances. (Author)

AD-640 734 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Armed Forces Radiobiology Research Inst., Bethesda, Md.
A MODEL FOR POSTRADIATION STEM CELL KINETICS,
by S. J. Baum. Jul 66, 16p AFRRI-SP66-16
Proj. DB-03.1473
Presented at the International Congress of Radiation Research (3rd), Cortina, Italy, 27 June 1966.

Descriptors: (*Radiation effects, *Hemopoietic system), Erythrocytes, Radiation injuries, Blood diseases, Radiological dosage, Recovery, Rats.

In polycythemic rats observed for 17 days postradiation (300 R, 250 KVP X-rays) it was noted that stem cell release diminished to 8 percent of the control values during the first 24 hours. This was followed by a rapid recovery from the 2nd to the 5th day. A second decrease was noted from the 6th to the 9th day and a third depression from the 9th to the 12th day. Thereafter, the oscillations diminished indicating a possible return toward the preradiation normal state. Similar recovery curves were observed in rats exposed to 200 rads X-ray or fission radiation. An attempt was made to correlate these findings with a kinetic model of erythropoiesis. It was suggested that the initial depression in stem cell release might be due to cellular destruction and inhibition of cellular release mechanisms. The oscillations of the recovery curves were ascribed to possible rate differences in cellular movements from one precursor compartment to the subsequent one, and to competitive stimulations for progenitor cells from related cellular systems of the hematopoietic system. (Author)

AD-640 810 **Field 6R, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Armed Forces Radiobiology Research Inst., Bethesda, Md.
MEASUREMENT OF TRITIUM SURFACE CONTAMINATION,
by S. W. Porter Jr, and L. A. Slaback Jr. Jul 66, 21p AFRRI-SP66-13
Proj. DB-03.140
Presented at the Society for Radiological Protection's International Symposium entitled Radiological Protection of the Worker by the Design and Control of his Environment, Bournemouth, England, 21 April 1966.

Descriptors: (*Tritium, *Contamination), Surfaces, Measurement, Scintillation, Radiological contamination.

The paper describes several methods and techniques for measuring tritium surface contamination in reactor, accelerator, and tritium oxide environments. The problems associated with the presently used method of windowless flow proportional counting are discussed. A new method of utilizing special membrane swipe papers counted in a liquid scintillation system is described. The data from single channel and channel ratio liquid scintillation counting techniques, various swipe papers and various tritium absorption agents are presented with a statistical analysis. Various factors affecting liquid scintillating counting of inorganic tritium are discussed. This method gives approximately 20 percent efficiency with good statistics versus 1 percent efficiency and very poor counting statistics for flow proportional counting of tritium on swipe papers. From the standpoint of overall counting efficiency, reproducibility of counts, ease of counting, and physical strength, the vinyl membrane VM-1 paper counted in dioxane has been found to be best for general tritium surface contamination measurements. (Author)

AD-641 188 **Field 6R, 18C**
CFTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
THRESHOLD DISTANCES FOR RETINAL BURNS FROM LOW-YIELD NUCLEAR DETONATIONS.
Rept. for Jan-Feb 66,
by Everett O. Richey. Jul 66, 16p SAM-TR-66-49
Proj. AF-6301
Task 630103

Descriptors: (*Burns, *Retina), (*Radiation injuries, Thresholds (Physiology)), Ophthalmology, Radiation hazards, Nuclear explosions, Eye, Flashblindness, Diurnal variations.

A method is given for predicting the threshold distances at which minimal retinal burns will be produced by nuclear detonations. This method relates calculated retinal exposure to experimentally determined burn threshold data. Predicted threshold distances are determined for the human eye exposed to sea-level, air-burst detonations from 0.01 to 10 kt. yield. The pupil diameter of the human eye is taken to be 2.5 mm. and 6.0 mm., respectively, for day and night conditions, and the effective focal length of the eye is taken to be 17 mm. The threshold distance for a bright daylight exposure with clear air (80 km.) visibility varies from about 1.3 to 11 km. as the detonation yield varies from 0.01 to 10 kt. Comparable distances for night exposures vary from 3.8 to 26 km. Calculations indicate that the use of a fixed filter with 2% transmission will result in retinal exposures more than an order of magnitude below the threshold exposure for these small daylight detonations. For nighttime conditions the retinal exposure is a factor of about 2.5 below the threshold exposure. (Author)

AD-641 191 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.75
Technology, Inc., San Antonio, Tex. Life Sciences Div.
RESEARCH TOWARD THE DEVELOPMENT OF EYE EFFECTS SAFE SEPARATION CHARTS.
Final rept., 31 May 65-31 May 66,
by Arthur F. Muller, and Patrick W. Wilson, Jr.
Jul 66, 89p
Contract AF 41 (609)-2437
Proj. AF-6301
Task 630103

Descriptors: (*Burns, *Retina), (*Nuclear explosions, *Radiation injuries), Mathematical models, Safety, Temperature, Thermal radiation, Time, Thresholds (Physiology).

The purpose of this report is to make known the research methods, results, and conclusions involved in a study which was to develop eye safe separation distances from nuclear detonations in terms of yield, altitude, slant range, etc. Under the precept that retinal temperature is the most significant factor in ocular damage, a mathematical model for the prediction of retinal temperature is outlined. Theoretical and empirical fireball source data are input separately to the model in an effort to determine the applicability of the theoretical data by comparing calculated retinal temperature rise. The results of the comparisons are favorable. However, it is concluded that, presently, the model retinal temperature predictions must be used with reservation. (Author)

BNWL-250 **Field 6R, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
ADVANCED ALPHA-BETA-GAMMA HAND AND SHOE CONTAMINATION MONITOR,
by E. M. Sheen, C. A. Ratcliffe, and L. V. Zuerner. Aug 66, 25p
Contract AT (45-1)-1830

Descriptors: (*Radiation monitors, Radiobiology), (*Radiological contamination, Radiation measurement systems).

For abstract, see NSA 20 21.

PB-173 188 **Field 6R**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
CHROMOSOMES ET RADIATIONS: ETUDE IN VITRO DE L'ACTION DES RAYONS X SUR LES LYMPHOCYTES HUMAINS (Chromosomes and Irradiation: In Vitro Study of the Action of X-Rays on Human Lymphocytes),
by Claude Mouriquand, Janine Patet, Claudine Gilly, and Charlotte Wolff. Jun 66, 39p CEA-R-3007
Text in French; Summary in English.

Descriptors: (*Lymphocytes, *Radiation effects), (*Chromosomes, Radiation effects), In vitro analysis, X rays, Anomalies, Dose rate, Blood, France.

Identifiers: Karyotypes.

Radio-induced chromosomal aberrations were studied in vitro on leukocytes of human peripheral blood after irradiation at 25, 50, 100, 200 and 300r. the numeric and structural anomalies were examined on 600 karyotypes. The relationship between these disorders and the dose delivered to the blood are discussed. An explanation on their mechanism of formation is tentatively given. (Author)

AD-235 624 **See Field 11I**

AD-76 914 **See Field 11I**

PB-173 242 **See Field 18F**

UCRL-14700 **See Field 18H**

6S. STRESS PHYSIOLOGY

AD-244 814 **Field 6S, 5J**
CFSTI Price: HC$1.60
Army Medical Research Lab., Fort Knox, Ky.
THE EFFECT OF MENTAL SET UPON VESTIBULAR NYSTAGMUS AND THE ELECTROENCEPHALOGRAM,
by William E. Collins, George H. Crampton, and Jerome B. Posner. 12 Sep 60, 19p Rept. no. 439
Proj. USMARL-6X95-25-001
Task 04

Descriptors: (*Vestibular apparatus, Stimulation), (*Nystagmus, Psychophysiology), (*Electroencephalography, Nystagmus), Attention, Performance (Human), Acceleration tolerance.

Simultaneous recordings of horizontal nystagmus and EEG were obtained during vestibular stimulation. Six subjects were given tasks involving attention to the stimulus, mental arithmetic, and reverie. Attending to the stimulus was not necessary to maintain nystagmic output, although reverie states considerably reduced it. The degree of general alertness seemed to be the important factor. The vestibular stimulation did not block the alpha rhythm and more alpha was produced during states involving mental arithmetic. (Author)

AD-450 726 **Field 6S**
CFSTI Price: HC$2.00
Human Engineering Labs., Aberdeen Proving Ground, Md.
HIGH-INTENSITY IMPULSE NOISE: A MAJOR PROBLEM,
by Robert F. Chaillet, Georges R. Garinther, David C. Hodge, and Fred N. Newcomb. Aug 64, 42p Technical note TN-4-64

Descriptors: (*Noise, Hearing), (*Sound, Pressure), Shock waves, Intensity, Analysis, Human engineering, Combat noise, Ear, Helmets, Tolerances (Physiology), Tactical weapons, Protective clothing, Safety devices.

The report describes the impulse sound-pressure-level problem created by modern firepower and presents techniques for partially attenuating these levels at crew positions. It also discusses the effect of high-intensity impulse noise on hearing. (Author)

AD-457 349 **Field 6S**
CFSTI Price: HC$5.60
Aeromedical Research Lab. (6571st), Holloman AFB, N. Mex.
DYNAMIC RESPONSE ANALYSIS OF + Gx IMPACT ON MAN.
by Hubert C. Feder, and E. H. Root. Nov 64, 56p ARL-TR-64-11
Proj. AF-7231
Task 723106

Descriptors: (*Stress (Physiology), Deceleration), (*Deceleration, Measuring devices (Electrical + electronic)), Reaction (Psychology), Biophysics, Test methods, Test equipment, Anatomical models, Models (Simulations), Impact shock, Accelerometers, Analog systems, Analog computers, Space medicine, Humans, Thorax.

An analog computer was used to compare the dynamic response of an accelerometer placed over the sternum of human test subjects during impact in + G sub x direction with the response of second and higher order spring-mass systems. Identity of the response modes of both systems, human and mechanical, was approximated by trial and error modification of natural frequency and damping coefficient of the computer model used. With restriction to only a few cases investigated and to the particular test conditions, best compliance of complete response coverage is considered to result from the application of a single spring-mass system of irregularly varying damping coefficient. A parametric analysis of the single spring-mass system is presented to aid the use of standardized impact profiles. The usefulness of the method of response approximation has been established, but the validation of the underlying concept of response predictability needs further investigation. (Author)

AD-457 895 **Field 6S, 6A**
CFSTI Price: HC$2.00
Aeromedical Research Lab. (6571st), Holloman AFB, N. Mex.
CHIMPANZEE SERUM BIOCHEMIC ALTERATIONS DURING AND FOLLOWING 24 HOURS OF RESTRAINT.
Interim rept., Nov 61-May 63,
by Ralph A. Scott, Jr. Oct 64, 28p ARL-TR-64-12
Proj. AF-6892
Task 689203

Descriptors: (*Blood chemistry, *Confinement (Psychology)), Chimpanzees, Blood serum, Biochemistry, Blood proteins, Blood analysis, Cholesterol, Urea, Nitrogen, Phosphates, Potassium, Carbon dioxide, Stress (Psychology), Stress (Physiology), Sex.

Chimpanzee response to 24 hours of restraint was measured by biochemic serum alterations. Serum values in blood drawn immediately before, immediately after, 24 hours post-, and for a limited number of cases, 7 days post-restraint, are compared. The values are analyzed for significant deviations in relation to age, sex, and duration of restraint. The most pronounced changes with restraint occurred in potassium, inorganic phosphate, and total cholesterol. (Author)

AD-458 366 **Field 6S, 6C**
CFSTI Price: HC$1.00
Aeromedical Research Lab. (6571st), Holloman AFB, N. Mex.
CHIMPANZEE URINE BIOCHEMIC ALTERATIONS DURING 24 HOURS OF RESTRAINT.
Interim rept., Nov 61-May 63,
by Ralph A. Scott, Jr. Oct 64, 21p ARL-TR-64-14
AF-6892
Task 689203

Descriptors: (*Urine, Analysis), (*Chimpanzees, Urine), (*Confinement (Psychology), Stress (Physiology)), Biochemistry, Sex, Volume, Potassium, Chlorides, Epinephrine, Amines, Steroids, Stress (Psychology).

Chimpanzee response to 24 hours of restraint was measured by alteration in urine biochemic values. Values in four consecutive 6-hour urine collections are compared. The values are analyzed for significant deviations in relation to age, sex, urine volume, and duration of restraint. The most pronounced changes with restraint occurred in urine potassium, chloride, epinephrine, total catechol amines, 17-ketosteroids, and in the urine volume. (Author)

AD-640 672 **Field 6S**
Not available from CFSTI.
Pennsylvania State Univ., University Park. Dept. of Zoology.
ADRENOCORTICAL RESPONSE TO SIMULATED HIGH ALTITUDE AND TO OXYGEN AT HIGH PRESSURE,
by R. T. Houlihan, R. E. Weiner, and J. Zavdni. 1966, 1p
Grant PHS-AM-6323
Proj. NR-102-654
Availability: Published in The Physiologist v9 n3 Aug 1966.

Descriptors: (*Adrenal cortex hormones, *High altitude), Secretion, Corticosteroid agents, Oxygen, Pressure, Simulation, Chromatographic analysis, Fluorescence, Stress (Physiology), Adrenal glands, Rats.

The study was initiated to investigate the adrenocortical response of rats to simulated high altitude or low oxygen tension and to high oxygen pressure. Animals were maintained in an air environment at 305 mm Hg and 745 mm Hg, absolute pressure and in an oxygen environment at 750 mm Hg absolute. The corticosterone content of plasma and 3 hours adrenal gland incubates was determined at one, two and seven days for the animals in the air environment and at one and two days in the oxygen environment. The steroid was identified by chromatography and fluorescent spectral analysis; and quantitated with sulfuric acid fluorescence. The results of this study show that in the simulated high altitude there is an initial rise in plasma corticosterone for two days followed by a severe decline at seven days. The corticosterone produced by excised adrenal glands on a ugm per mg wet weight basis declined throughout this study. In oxygen at high pressure no appreciable response was detectable at one day but the plasma corticosterone level at two days had increased significantly. It appears that in these extreme environments the adrenal gland plays a role in the debilitation of the animal. (Author)

AD-640 870 **Field 6S, 6C**
CFSTI Prices: HC$3.00 MF$0.75
Aeromedical Research Lab., (6571st), Holloman AFB, N. Mex.
AN EXPLORATORY STUDY OF THE EFFECTS OF A HYPERBARIC ENVIRONMENT ON THE CHIMPANZEE.
Rept. for 28 Nov-11 Dec 65,
by Alfred G. Koestler, and Phillip W. Day. Sep 66, 57p 6571-ARL-TR-66-17

Descriptors: (*Chimpanzees, *High-pressure research), Compressed air, Stress (Physiology), Behavior, Reaction (Psychology), Reflexes, Audiometry, Medical examination, Adaptation (Physiology).

Two chimpanzees used in six separate tests were exposed to hyperbaric conditions equivalent to 50, 200, and 300 feet of seawater. Pressures were accomplished with compressed air in a dry compression chamber. Both subjects accomplished the dives without apparent physiological damage. Behavioral tasks showed small temporary decrements during extreme pressures, particularly in auditory reaction times. No symptoms of dysbarism or inert gas narcosis were evident. The use of the chimpanzee as a precursor to man in high-pressure research is recommended. (Author)

AD-640 908 **Field 6S**
Not available from CFSTI.
McGill Univ., Montreal (Quebec). Aviation Medical Research Unit.
VESTIBULAR INAPTITUDE IN THE ENVIRONMENTS OF FLIGHT AND SPACE.
by G. Melvill Jones. 1965, 16p
Prepared for presentation at the Section of Otology, Royal Society of Medicine, Oxford, July 9th, 1965.
Availability: Published in The Journal of Laryngology and Otology v80 n3 p207-21 Mar 1966.

Descriptors: (*Vestibular apparatus, Adaptation (Physiology)), Space medicine, Aviation medicine, Acceleration tolerance, Ear, Eye, Central nervous system, Semicircular canals, Canada.

The vestibular system has become highly adapted to the particular patterns of head movement normally associated with the environment in which it has evolved. But in flight and space, totally different patterns of movement are encountered and serious mis-matching can arise between this sensory system and the new environment. The nature of such inaptitude is examined in terms of current physiological understanding of the otolith organs, semicircular canals, associated central neural mechanisms and the vestibulo-ocular reflex. Applied consequences are considered in the contexts of flight in the atmosphere and in space. (Author)

AD-641 113 **Field 6S, 22A**
CFSTI Prices: HC$7.00 MF$1.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
PHYSIOLOGICAL METHODS IN ASTRONAUTICS,
by R. M. Baevskii. 16 Aug 66, 303p FTD-MT-66-42
TT-66-62515
Edited machine trans. of mono. Fiziologicheskie Metody v Kosmonavtike, Mowcow, 1965 299p.

Descriptors: (*Space medicine, Telemeter systems), Data transmission systems, Spacecraft, Information theory, Astronautics, Transducers, Electrodes, Space flight, Monitors, Computers, Electrocardiography, Astronauts, Data storage systems, Vestibular apparatus, Galvanic skin response, USSR.

CONTENTS: Brief Historical Outline of Physiological Space Research; Transmission of Physiological Information from Spacecraft to Earth; Contemporary Physiological Measurement Systems on Spacecraft; Design Principles of Physiological Measurement and Information Systems for Use on Long-Term, Long-Range Space Flights; On-Board Automatic Physiological Information Processing Systems; Some Problems of Physiological Measurement in Interplanetary Flights; Cardiovascular Research Methods; Research on the External Respiratory Function; Methods for Studying the Neuromuscular System and Working Capacity; Methods for Studying the Vestibular Apparatus; Future Trends in the Development of Physiological Research in Astronautics.

AD-641 135 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Medical School, Ill.
INTERNAL BODY MOVEMENT ALONG THREE AXES RESULTING FROM EXTERNALLY APPLIED SINUSOIDAL FORCES.
Final rept., 31 May-30 Nov 63,
by John L. Nickerson, and Milana Drazic. Jul 66, 19p
Contract AF 33 (657)-10748
Proj. AF-7231
Task 723101
AMRL-TR-66-102

Descriptors: (*Vibration, Tolerances (Physiology)), Resonant frequency, Damping, Body, Tissues (Biology), Stress (Physiology), Dogs, Anesthesia.

The report presents the results of observations on the resonance frequency and damping of a number of internal visceral body structures determined when the whole body is exposed to vibrations along three axes of the body. The X-ray method used is a modification of the system developed earlier. The results, using anesthetized dogs, are as follows. Along the long axis of the body, (Z), the resonance frequency and damping are the average respectively 4.4 cycles per second and 0.29 of the critical value. However, on axes at right angles to the long axis of the body, i.e., the transverse axis, (Y), and the dorso-ventral axis, (X), the values are respectively 9.1 and 8.9 cycles per second for the resonant frequency and 0.35 and 0.37 for the damping factor along the corresponding axes. (Author)

N66-30084 **Field 6S**
CFSTI Prices HC$1.00 MF$1.25
National Aeronautics And Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY A CONTINUING BIBLIOGRAPHY WITH INDEXES.
Jun 66, 193p NASA-SP-7011/25/

Descriptors: *Aerospace medicine, *Bibliography, *Bioastronautics, Abstract, Aerospace, Animal, Bioinstrumentation, Biology, Environment, Flight, Human, Index, Life, Man, Medicine, Physiology, Psychology, Safety, Sanitation, Simulation, Space, Support, Survival, System, Toxicology.

For abstract, see STAR 04 17.

N66-30115 **Field 6S**
CFSTI Prices HC$3.00 MF$0.75
Douglas Aircraft Co., Inc., Santa Monica, Calif. Advance Biotechnology Dept.
A COMPARATIVE STUDY OF THE PHYSIOLOGICAL EFFECTS OF IMMERSION AND BED REST.
by L. M. Finney, J. W. Nyberg, P. D. White, and W. J. White. Jun 66, 83p NASA-CR-65414, DAC-59226
Contract NAS9-4166

Descriptors: *Bed rest, *Immersion, *Physiological response, *Silicone, Bed, Cell, Clearance, Excretion, Fluid, Free, Human, Kidney, Orthostatic, Output, Physiology, Response, Rest, Skin, Tolerance, Urine, Water.

For abstract, see STAR 04 17.

N66-30531 **Field 6S**
CFSTI Prices HC$3.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Advance Biotechnology Dept.
INFLUENCE OF PERIODIC CENTRIFUGATION ON CARDIOVASCULAR FUNCTIONS OF MAN DURING BED REST.
by L. M. Finney, J. W. Nyberg, P. D. White, and W. J. White. Jun 66, 54p NASA-CR-65422, DAC-59286
Contract NAS9-4166

Descriptors: *Bed rest, *Cardiovascular system, *Centrifugal force, *Human tolerance, Acceleration, Bed, Cardiovascular, Centrifugal, Centrifugation, Force, Function, Gravity, Human, Physiology, Positive, Rest, System, Tolerance.

For abstract, see STAR 04 17.

N66-30545 **Field 6S**
CFSTI Prices HC$6.00 MF$1.25
Columbia Univ., New York. Electronics Research Labs.
METHODS FOR DETERMINING BLOOD FLOW THROUGH INTACT VESSELS OF EXPERIMENTAL ANIMALS UNDER CONDITIONS OF GRAVITATIONAL STRESS AND IN EXTRA-TERRESTRIAL SPACE CAPSULES FINAL REPORT, 1 NOV. 1960 - 31 DEC. 1964.

by A. F. Sciorra, and R. F. Shaw. 4 Jan 65, 235p NASA-CR-76205, CU-5-65-NASA-112-ERL
Grant NSG-112-61

Descriptors: *Blood flow, *Electromagnetic instrument, *Extraterrestrial environment, *Flow meter, *Gravitational effect, Animal, Artifact, Blood, Capsule, Compensation, Effect, Electromagnetic, Environment, Extraterrestrial, Flow, Gravitational, Instrument, Meter, Receiver, Signal, Space, Stress, Study, Vessel.

For abstract, see STAR 04 17.

N66-30693 Field 6S
CFSTI Prices HC$1.00 MF$0.50
Aerospace Medical Div. Aeromedical Research Lab. (6571st), Holloman Afb, N. Mex.
QUANTITATIVE EFFECTS OF ABRUPT DECELERATION ON PULMONARY DIFFUSION IN MAN TECHNICAL REPORT,.
by W. K. Brown, P. Foster, H. F. Scherer, and A. C. Whitehouse. May 66, 20p NASA-CR-76375, ARL-TR-66-12
NASA ORDER T-13335G

Descriptors: *Deceleration, *Pulmonary function, *Stress (biol), Capacity, Carbon monoxide, Consumption, Diffusion, Function, Human, Lung, Oxygen, Physiology, Pulmonary.

For abstract, see STAR 04 17.

N66-31873 Field 6S
CFSTI Prices HC$2.50 MF$0.75
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Bad Godesberg (West Germany). Institut Fuer Flugmedizin.
THE REACTION OF PULSE RATE AND ETHER-DECHOLIN-TIME UNDER HIGH PRESSURE.
Das Verhalten Der Pulsfrequenz Und Der Aether-decholinzeit Im Ueberdruck
by U. Bels. May 66, 64p DLR-FB-66-36, DVL-510
In German, English Summary

Descriptors: *Bradycardia, *Ether, *Pulse rate (biol), Electrocardiography, Heart, High pressure, Pulse, Rat, Rate, Reaction, Time.

For abstract, see STAR 04 17.

N66-31941 Field 6S
CFSTI Prices HC$5.00 MF$1.25
Lovelace Foundation For Medical Education And Research, Albuquerque, N. Mex.
THE EFFECTS OF CONFINEMENT AS A FACTOR IN MANNED SPACE FLIGHT.
by T. M. Fraser. Jul 66, 184p NASA-CR-511
Contract NASR-115

Descriptors: *Confinement, *Human reaction, *Isolation, *Manned space flight, *Psychophysiology, *Sensory deprivation, Annotation, Bibliography, Body, Deprivation, Human, Manned, Measurement, Monitor, Physiology, Psychology, Reaction, Response, Sensory, Space flight.

For abstract, see STAR 04 17.

N66-32262 Field 6S
CFSTI Prices HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn.
STUDIES OF CIRCADIAN CYCLES IN HUMAN SUBJECTS DURING PROLONGED ISOLATION IN A CONSTANT ENVIRONMENT USING 8-CHANNEL TELEMETRY SYSTEMS MEMORANDUM REPORT NO. 66-4.
by B. R. Clegg, and K. E. Schaefer. 10 Feb 66, 13p NASA-CR-76704
NASA ORDER R-24

*Human body, *Isolation, *Physiological telemetry, Analysis, Body, Chamber, Channel, Circadian, Constant, Cycle, Data, Eight, Environment, Heart, Human, Physiology, Prolongation, Rate, Respiration, Skin, Sleep, System, Telemetry, Temperature, Transmission.

For abstract, see STAR 04 17.

N66-32618 Field 6S
CFSTI Prices HC$2.50 MF$0.50
Goodyear Aerospace Corp., Litchfield Park, Ariz.
SPATIAL ORIENTATION IN A WEIGHTLESS ENVIRONMENT SUMMARY REPORT (FINAL).
by R. Mayne. 15 Apr 66, 60p NASA-CR-65429, GERA-1158
Contract NAS9-4460

Descriptors: *Biological model, *Human engineering, *Manned space flight, *Spatial orientation, *Weightlessness simulation, Biology, Concept, Engineering, Environment, Flight, Human, Man, Medicine, Model, Orientation, Physics, Physiology, Simulation, Space, Spatial, Theory, Weightlessness.

For abstract, see STAR 04 17.

N66-36854 Field 6S
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECTS OF ACUTE AND CHRONIC HYPOHYDRATION ON TOLERANCE TO PLUS GZ ACCELERATION IN MAN. I - PHYSIOLOGICAL RESULTS.
by E. G. Averkin, J. S. Bosco, L. G. Douglas, J. E. Greenleaf, and M. Matter Jr. Sep 66, 42p NASA-TM-X-1285

Descriptors: *Acceleration tolerance, *Dehydration, *Gravity, *Human reaction, *Physiological index, Acceleration, Acute, Chronic, Deprivation, Human, Index, Man, Physiology, Reaction, Tolerance, Water.

For abstract, see STAR 04 22.

N66-37042 Field 6S
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECTS OF ACUTE AND CHRONIC HYPOHYDRATION ON TOLERANCE TO PLUS GZ ACCELERATION IN MAN. II - IMPRESSIONS OF SUBJECTS.
by J. E. Greenleaf, M. Matter Jr, and S. A. Raymond. Sep 66, 47p NASA-TM-X-1255

Descriptors: *Acceleration stress, *Dehydration, *Human tolerance, *Physiological response, Acceleration, Astronaut, Cardiovascular, Human, Muscle, Physiology, Response, Stress, Tolerance, Vision.

For abstract, see STAR 04 22.

N66-37321 Field 6S
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla. Aerospace Medical Inst.
THE INVERSION ILLUSION IN PARABOLIC FLIGHT - ITS PROBABLE DEPENDENCE ON OTOLITH FUNCTION.
by A. Graybiel, and R. S. Kellogg. 20 Jul 66, 15p NASA-CR-78067, NAMI-974
NASA ORDER R-93
Joint Rept. With Nasa Its Rept.-134

Descriptors: *Illusion, *Inversion, *Otolith, *Parabolic flight, Apparatus, Deafness, Defect, Dependence, Function, Labyrinth, Perception, Pressure, Touch, Vestibular, Weightlessness.

For abstract, see STAR 04 22.

N66-37360 Field 6S
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla. Naval Aerospace Medical Inst.
LACK OF RESPONSE TO THERMAL STIMULATION OF THE SEMICIRCULAR CANALS DURING THE WEIGHTLESSNESS PHASE OF PARABOLIC FLIGHT.
by A. Graybiel, and R. S. Kellogg. 9 Aug 66, 16p NASA-CR-78224, NAMI-977
NASA ORDER R-93

Descriptors: *Nystagmus, *Parabolic flight, *Semicircular canal, *Weightlessness, Caloric, Canal, Endolymph, Flight, Parabolic, Phase, Response, Semicircular, Stimulation, Weight.

For abstract, see STAR 04 22.

AD-640 969 **See Field 6E**

AD-640 970 **See Field 6E**

AD-641 016 **See Field 6P**

6T. TOXICOLOGY

N66-32135 Field 6T
CFSTI Prices HC$1.00 MF$0.50
St. Johns Univ., Jamaica, N. Y. Dept. Of Biology.
AN INVESTIGATION OF A SONO-CHEMICAL APPROACH IN STERILIZATION PROBLEMS FOURTH SEMIANNUAL PROGRESS REPORT, 1 JAN. - 30 JUN. 1966.
by M. A. Pisano. 1966, 13p NASA-CR-76618
Grant NSG-684

Descriptors: *Propylene oxide, *Spore, *Sterilization, *Ultrasonic wave, Airborne, Bacillus, Chemical, Combination, Concentration, Distance, Duration, Exposure, Irradiation, Oxide, Propylene, Sound, Ultrasonic, Wave.

For abstract, see STAR 04 17.

N66-32296 Field 6T
CFSTI Prices HC$2.50 MF$0.75
Miami Univ., Coral Gables, Fla. Research And Teaching Center Of Toxicology.
REPORT OF TOXIC EFFECTS OF FLUORINE FOLLOWING SHORT-TERM INHALATION.
by M. L. Keplinger. 31 May 66, 82p NASA-CR-76741
Contract NGR-10-007-012

Descriptors: *Animal study, *Fluorine, *Kidney, *Liver, *Lung, *Toxicity, Air, Animal, Breathing, Chamber, Dog, Exposure, Eye, Guinea pig, Inhalation, Intoxication, Mouse, Pathology, Rabbit, Rat, Skin, Study.

For abstract, see STAR 04 17.

N66-37278 Field 6T
CFSTI Prices HC$1.00 MF$0.50
Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-patterson Afb, Ohio.
TOXICITY STUDIES OF COOLANOL 15 FINAL REPORT, JAN. - SEP. 1965.
by D. T. Harper Jr, F. R. Robinson, and R. F. Ziegler. Dec 65, 22p NASA-CR-78150, AMRL-TR-65-213
NASA ORDER T-31248-G

Descriptors: *Coolant, *Heat transfer, *Toxicity, Animal, Fluid, Injection, Manned Spacecraft, Study, Synthetic, System, Toxicology.

For abstract, see STAR 04 22.

AD-640 895 **See Field 6O**

AD-640 910 **See Field 6A**

PB-173 248 **See Field 6O**

PB-173 249 See Field 6O

PB-173 250 See Field 6O

PB-173 308 See Field 6O

PB-173 334 See Field 6O

6U. WEAPON EFFECTS

AD-640 595 Field 6U, 13L, 15F
CFSTI Prices: HC$4.00 MF$0.75
Naval Applied Science Lab., Brooklyn, N. Y.
RADIANT EXPOSURES FOR IGNITION OF TINDER BY THERMAL RADIATION FROM NUCLEAR WEAPONS.
Progress rept. (Final),
by J. Bracciaventi, R. Heilferty, and W. Derksen.
5 Jul 66, 112p Rept. no. 9400-12, PR-14
Task 12.009

Descriptors: (*Nuclear weapons, *Thermal radiation), (*Materials, Nuclear weapons), Ignition, Damage.

The radiant exposure to ignite tinder materials for thermal radiation from nuclear weapons was measured. The experiments involved 41 materials commonly encountered in urban areas and are to provide basic data of direct use in the determination of fires caused by nuclear weapons and to provide basic information for ignition prediction models. The radiant exposures for ignition of the most susceptible common material, newspaper (dark picture) ranged from 5.1 cal cm (-2) to 31 cal cm (-2) for bursts of 20 kt to 100 Mt respectively. Black roll roofing, a common material representing an important but less susceptible fuel, ignited at 38 cal cm (-2) for a 1 MT pulse and 45 cal cm (-2) for a 10 Mt pulse. Other thin fuels ignited at various intermediate or higher exposures. Thick wood fuels, such as might be used as building siding, were ignited to sustained flaming by the simulated detonation pulses. Cedar shingle was ignited at 15 cal cm (-2) by a 1 MT pulse, and at 26 cal cm (-2) by a 10 Mt pulse. (Author)

AD-640 921 Field 6U
CFSTI Prices: HC$1.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Structural Mechanics Lab.
EFFECTS OF OVERPRESSURE ON THE EAR,
by Arthur E. Hirsch. Aug 66, 14p
Proj. S-F015-14-04
DTMB-2252

Descriptors: (*Blast, Hearing), (*Pressure, Tolerances (Physiology)), (*Ear, Wounds + injuries), Explosion effects, Nuclear explosions.

Tolerance levels of the human ear to various types of overpressure are discussed. (Author)

7A. CHEMICAL ENGINEERING

AD-641 058 Field 7A, 9B
Not available from CFSTI.
California Univ., Los Angeles. Dept. of Engineering.
CONVERSION CONTROL IN A CONTINUOUS REACTOR TRAIN: SYNTHESIS AND COMPUTER SIMULATION.
Revised ed.,
by David A. Wismer. 30 Jul 65, 7p
Grant AF-AFOSR-699-65
Proj. AF-9749
Task 974901
AFOSR-66-0662
Revision of manuscript submitted 8 Feb 65.
Availability: Published in IEEE Transactions on Automatic Control vAC10 n4 p455-60 Oct 1965.

Descriptors: (*Chemical engineering, Industrial equipment), (*Industrial equipment, Simulation), (*Synthetic rubber, Industrial production), Control systems, Automata, Synthesis, Programming (Computers), Temperature control, Styrene plastics, Butadienes, Difference equations.

Identifiers: Reactors (Chemical).

A feedforward control scheme is synthesized for control of final product conversion in a train of continuous stirred-tank reactors. The control is achieved by temperature manipulation in the latter reactors and utilizes a continuous conversion measurement within the train. The control scheme is developed in terms of difference equations which are suitable for implementation on a digital control computer. As a specific example, the styrene-butadiene-rubber process is considered in detail and the control is evaluated by a digital computer simulation. (Author)

AD-641 108 Field 7A, 11F, 11J
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
UTILIZING WASTES OF THE SYNTHETIC RUBBER INDUSTRY IN THE ROLE OF ACID CORROSION DECELERATORS,
by V. A. Khitrov, and V. P. Zadorozhnii. 30 Mar 66, 12p FTD-TT-65-1626
TT-66-62519
Unedited rough draft trans. of Khimicheskaya Promyshlennost (USSR) n4 p307-10 1964.

Descriptors: (*Wastes (Industrial), *Corrosion inhibition), (*Synthetic rubber, Wastes (Industrial)), Industrial equipment, Acids, Steel, Stainless steel, Copper, Sulfuric acid, Hydrochloric acid, Nitric acid, Hydrocarbons, Alcohols, USSR.

When manufacturing divinyl by catalytic decomposition of ethyl alcohol, synthetic rubber plants are using various wastes of complex composition, which can serve as decelerators of acid corrosion of certain metals. To these wastes belong so called 'foamy reagent' (an alcohol-hydrocarbon mixture), vat remains (low B.P. hydrocarbons), and motor fuel (non-polymerized hydrocarbons). The effectiveness of these wastes in retarding corrosion in the following systems is reported: low carbon steel 08 in 1 and 7 percent solutions of sulfuric and hydrochloric acid solutions; stainless steel 1KH18N9T in 1 and 7 percent of hydrochloric acid; copper in 3 percent nitric acid.

N66-31920 Field 7A, 13H
CFSTI Prices HC$1.00 MF$0.50
Polish Academy Of Sciences, Warsaw. Inst. Of Nuclear Research.
STUDY OF THE POSSIBILITY OF A COUPLING OF THE SULPHURIC ACID AND NITROGEN-15 PRODUCTION.
Studium Nad Mozliwoscia Sprzegniecia Produkcji Kwasu Siarkowego Metoda Nitrozowa Z Produkcja Azotu-15
by J. Bulanda, and A. Selecki. 1965, 25p REPT.-674/XVI/J
In Polish

Descriptors: *Chemical engineering, *Nitrogen 15, *Production engineering, *Sulfuric acid, Acid, Chemical, Combination, Concentration, Coupling, Economics, Engineering, Process, Production, Sulfuric, Technology, Tower.

For abstract, see STAR 04 17.

PB-173 371 Field 7A, 14B
CFSTI Prices: HC$2.00 MF$0.50
Soskuty (O.V.), Frankfurt am Main (West Germany).
MEASURING, RECORDING AND CONTROL INSTRUMENTS FOR THE CHEMICAL INDUSTRY, AND RELATED EQUIPMENT IN THE FEDERAL REPUBLIC OF GERMANY,
by O. V. Soskuty. Jul 66, 40p
Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Chemical industry, West Germany), (*Instrumentation, Chemical engineering), Recording systems, Control systems, Measurement, Economics, Commerce.

ORNL-3958 See Field 18G

PB-173 246 See Field 5C

7B. INORGANIC CHEMISTRY

AD-640 545 Field 7B
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
ANALYSIS OF METALLIC MATTE, ORIGIN UNKNOWN,
by E. R. Wright. Sep 66, 5p NAEC-AML-2488

Descriptors: (*Chemical analysis, Materials), Spectroscopy, Electron diffraction analysis, Density, Nickel, Cobalt, Sulfides.

AD-640 565 Field 7B, 7C
CFSTI Prices: HC$2.60 MF$0.50
Imperial Coll. of Science and Technology, London (England).
TRANSITION-METAL FLUOROCARBON COMPLEXES. PART I. DERIVATIVES OF PERFLUORO-OLEFINS.
Final technical rept.,
by H. H. Hoehn, L. Pratt, K. F. Watterson, and G. Wilkinson. Jan 61, 23p
Contract AF 61 (052)-176
Report on Transition Metal-Carbon Chemistry.

Descriptors: (*Complex compounds, *Halogenated hydrocarbons), (*Alkenes, Complex compounds), (*Metal carbonyls, Complex compounds), Cyclohexenes, Dienes, Molecular orbitals, Spectra (Infrared), Nuclear magnetic resonance, Mass spectrum, Cobalt compounds, Ethylenes, Methane, Fluorine compounds, Iodine compounds, Great Britain.

Identifiers: Cobalt carbonyls, Iron carbonyls, Octafluoro cyclohexadienes, Tetrafluoro ethylenes, Trifluoro iodomethanes.

The interaction of tri-iron dodecacarbonyl, Fe3 (CO)12, with octafluorocyclohexa-1,3- or 1,4-dienes forms a compound C6F8Fe (CO)3 which must be formulated as a pi-bonded olefin complex. In contrast, the interaction of tetrafluoroethylene with Fe3 (CO)12 gives a compound C4F8Fe (CO)4 in which the iron atom is bound to carbon by sigma-bonds in a perfluorocycloalkane ring. Infrared, high-resolution nuclear magnetic resonance and mass spectroscopic studies support these formulations. Products from the interaction of C2F4 with Co2 (CO)8 and (pi-C5H5)2Co and of the latter with CF3I are described. (Author)

AD-640 583 Field 7B
CFSTI Prices: HC2.60 MF$0.50
Southampton Univ. (England).
RESEARCH ON STEREOCHEMISTRY OF CO-ORDINATION NUMBER FIVE.
Final technical rept., 1 Jan 60-31 Dec 61,
by G. W. A. Fowles. 31 Dec 61, 30p
Contract AF 61 (052)-318

Descriptors: (*Complex compounds, *Stereochemistry), (*Titanium compounds, Complex compounds), (*Vanadium compounds, Complex compounds), (*Molybdenum compounds, Complex compounds), (*Tungsten compounds, Complex compounds), Molecular structure, Molecular weight, Magnetic properties, Dipole moments, Spectra (Visible + ultraviolet), Spectra (Infrared), Valence, Great Britain.

Co-ordination compounds were synthesized (mainly with monodentate ligands) for the following

elements: Ti (IV), Ti (III), V (IV), V (III), Mo (V), W (V). Structural information was obtained for many of the compounds by measurements of molecular weight, magnetic susceptibility, dipole moment, and spectra, (u.v., visible, and i.r.). (Author)

AD-640 600 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE BEHAVIOR OF NITRIC ACID, ETHYL NITRATE AND NITRIC ANHYDRIDE IN SULFURIC ACID SOLUTION,
by L. P. Kuhn. 1 Apr 47, 13p Rept. no. 630

Descriptors: (*Nitric acid, Chemical properties), (*Nitrates, Chemical-properties), (*Nitration, Solutions), Sulfuric acid, Chemical reactions, Anhydrides, Ionization, Spectroscopy, Freezing point depressants, Hydrolysis, Oxides.

Identifiers: Nitrogen oxides, Cryoscopic analysis.

Evidence based upon spectroscopic and cryoscopic data and upon chemical reactivity indicates that nitric acid, nitric anhydride and ethyl nitrate yield NO2 (+) ions in sulfuric acid solution, substantiating the results of previous investigators. A parallel is drawn between the ionization of these substances and the complex ionization of certain organic acids in sulfuric acid. The results are in accord with the currently accepted theory of the mechanism of nitration with mixed acids. (Author)

AD-640 762 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
Pennsalt Chemicals Corp., King of Prussia, Pa. Research and Development Dept.
HIGH PRESSURE (70 KBAR) SYNTHESIS OF NEW CRYSTALLINE LEAD DICHALCOGENIDES.
Technical rept.,
by Meyer S. Silverman. Oct 66, 10p TR-51
Contract Nonr-2687 (00)
Proj. NR-356-408

Descriptors: (*Lead compounds, Synthesis (Chemistry)), (*Sulfides, Synthesis (Chemistry)), (*Selenides, Synthesis (Chemistry)), High-pressure research, Crystals, Chalcogens, X-ray diffraction analysis, Physical properties, Crystal structure.

Identifiers: Lead diselenide, Lead disulfide, Lead sulfoselenide.

By subjecting mixtures of the elements or of lead monochalcogenides with excess sulfur and selenium to temperatures of 600C to 2400C and pressures of 20 to 70 kilobars, it was possible to synthesize the stable crystalline compositions PbSe2, PbSSe and two polymorphs of PbS2, one of the latter appearing to be isomorphous with SnS2.

AD-640 893 **Field 7B, 7C, 21I**
CFSTI Prices: HC$1.00 MF$0.50
Idaho Univ., Moscow.
NEW HYPOFLUORITES CONTAINING NITROGEN.
Annual rept. no. 3, 1 Oct 65-30 Sep 66,
by Jean'ne M. Shreeve. 1 Oct 66, 19p
Contract Nonr-4217 (00), ARPA Order-442
See also AD-607 616.

Descriptors: (*Oxyfluorides, Synthesis (Chemistry)), (*Fluorine compounds, Synthesis (Chemistry)), (*Fluoramines, Synthesis (Chemistry)), (*Nitrogen compounds, Fluorides), Potassium compounds, Ureides, Halogenated hydrocarbons, Cesium compounds, Complex compounds, Sulfur compounds, Ketenes.

Identifiers: Bis (Trifluoromethyl) nitroxo compounds, Difluoroamino carbonyl fluorides, Nitrosyl fluoride, Perfluoro urea.

If 1.5 equivalents of NF2CFO is allowed to react with a single equivalent of KF to form what is likely a mixture of KOCF2NF2 and KOCF (NF2)2, this mixture may be thermally decomposed without explosion to yield perfluorourea. When KOCF (NF2)2 is reacted with SiCl4, a new volatile compound, NF2C (C1)O is obtained. NF2C (F)O gives NF2C (C1)O with AlCl3. N,N-bis (trifluoromethyl)hydroxylamine forms a solid adduct with either CsF or KF. The adduct will react at room temperature with perfluoroacyl and carbonyl halides to give the corresponding bis (trifluoromethyl)nitroxo-compounds. Bis (trifluoromethyl)ketene is highly reactive with compounds that ordinarily add across olefinic double bonds, e.g., S2O6F2, N2F4, and NF2OSO2F. With the latter two, two isomers are obtained. Treatment with fluorine at -20C in the presence of CsF yields hypofluorites. A simple preparation of FNO was found which involves the reaction of nitrogen dioxide with KF or CsF. The conversion is about 48 +%. This reaction may be carried out in metal or Pyrex glass vessels and the conversion rate is increased by heating.

AD-640 923 **Field 7B, 7C**
CFSTI Prices: HC$1.10 MF$0.50
Nottingham Univ. (England). Dept. of Chemistry.
THE CHEMISTRY OF BORON.
Final technical rept.,
by N. N. Greenwood. Feb 62, 6p
Contract AF 61 (052)-111
ARL-62-363

Descriptors: (*Boron compounds, Spectra (Infrared)), (*Organic compounds, Synthesis (Chemistry)), Labeled substances, Potassium compounds, Fluoborates, Heterocyclic compounds, Stereochemistry, Great Britain.

Identifiers: B-heterocyclic compounds, Potassium tetrafluoroborates.

Compounds enriched in B-10 were used to elucidate infra-red spectroscopic assignments of compounds such as potassium tetrafluoroborate. New types of heterocyclic boron compounds were synthesised and their physical and chemical properties compared with those of analogous open chain compounds. The use of such compounds in synthetic organic chemistry was evaluated. (Author)

AD-640 952 **Field 7B, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Materials Research Lab.
CRYSTAL CHEMISTRY STUDIES.
Quarterly rept. no. 5, 14 May-13 Aug 66,
by Rustum Roy, G. J. McCarthy, O. Muller, M. Rault, and W. B. White. Oct 66, 16p
Contract DA-28-043-AMC-01304 (E)
Proj. 1CO-14501-B13A
ECOM-01304-5
See also AD-636 054.

Descriptors: (*Crystals, Chemical properties), (*Rare earth compounds, Physical properties), (*Rhenium compounds, Physical properties), (*Oxides, Phase studies), Resistance (Electrical), Photoconductivity, Density, Solid solutions, Crystal growth, Neodymium compounds, Ytterbium compounds, Molybdenum compounds, Tungsten compounds, Europium compounds, Titanium compounds, Magnesium compounds, Chromium compounds, Cadmium compounds, Nickel compounds.

Additional measurements on the rare-earth rhenium oxides were made. The resistivity (approx. 20,000 ohm-cm) and evidence of some photoconductivity were found for single crystal Beta-Nd2ReO5. The densities of Yb2ReO5 (9.79 g/cc) and Beta-Nd2ReO5 (8.14 g/cc) were measured. The systems MoO3-ReO3 and WO3-ReO3 were examined with the conclusion that no solid solution exists between these components. An attempt at single crystal growth of ReO3 was unsuccessful. Systematic work was started in the system EuO-Eu2O3-TiO-TiO2. The compounds EuTiO3, Eu2Ti2O7, and a new compound Eu2TiO5 (possibly) have thus far been detected. Additional runs have been made in the systems MgO-Cr2O3-O, CdO-C-2O3-D, and NiO-Cr2O3-O. High oxygen pressure studies of the system Cr-Fe-O have been resumed. (Author)

AD-641 009 **Field 7B, 20L**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
A VOLUMETRIC DETERMINATION OF ARSENIC AND ANTIMONY IN MIXED MANGANESE ARSENIDE, ANTIMONIDE AND PHOSPHIDE COMPOUNDS,
by E. R. Whipple, and D. H. Ridgley. 21 Feb 66, 10p JA-2620
Contract AF 19 (628)-5167
ESD-TR-66-436
Analytica Chimica Acta v35 p499-507 1966.

Descriptors: (*Arsenic, Volumetric analysis), (*Antimony, Volumetric analysis), (*Manganese compounds, *Volumetric analysis), Arsenic alloys, Antimony alloys, Phosphides, Reduction (Chemistry), Solid solutions.

Identifiers: Manganese antimonides, Manganese phosphides, Manganese arsenides.

A procedure is described for the titrimetric determination of arsenic and antimony without separation. Total combined arsenic and antimony were determined by reduction with tin (II) chloride and titration with permanganate; antimony is found by selective reduction with mercury (I) chloride and titration with permanganate. A precision of 0.1-3.2% was obtained for total combined arsenic and antimony, and approximately 1% for antimony alone (small amounts in the presence of large amounts of arsenic). The procedure was developed for and applied to the analysis of synthesized compounds of the type MnAs (1-x)P (x)and MnAs (1-y)Sb (y). (Author)

AD-641 054 **Field 7B**
Not available from CFSTI.
Victoria Univ., Wellington (New Zealand). Dept. of Chemistry.
THE INFRARED SPECTRA OF SOME IRON (II) PYRIDINE COMPLEXES,
by J. F. Duncan, and K. F. Mok. 29 Nov 65, 5p
Grant AF-AFOSR-27-65
Proj. AF-9710
Task 971003
AFOSR-66-1411
Availability: Published in Australian Journal of Chemistry v19 p701-3 1966.

Descriptors: (*Iron compounds, Complex compounds), (*Pyridines, Complex compounds), (*Complex compounds, Spectra (Infrared)), Synthesis (Chemistry), Halides, Cyanates, Thiocyanates, Molecular association, New Zealand.

Iron forms a series of high-spin pyridine complexes of the type Fe (II)X2py4 where py is pyridine and X is any anionic ligand (e.g. C1, Br, I, SCN, OCN, and HCOO). The infrared spectra of seven such compounds are reported, two of which Fe12py4, 2py and Fe (OCN) 2py4) have not been prepared before. The conclusions obtained from this work support those from investigations of the Mossbauer spectra, the u.v. spectra, and the magnetic properties of these complexes.

AD-641 217 **Field 7A**
CFSTI Prices: HC$1.00 MF$0.50
Washington Univ., Seattle. Dept. of Chemistry.
A NEW METHOD FOR THE PREPARATION OF FLUORODISULFATE SALTS.
Technical rept.
by Darryl D. Des Marteau, and George H. Cady. 14 Oct 66, 8p TR-56
Contract Nonr-477 (16), ARPA order-26-60
Task 2

Descriptors: (*Fluorine compounds, Synthesis (Chemistry)), (*Sulfates, Synthesis (Chemistry)), Potassium compounds, Sodium compounds, Ammonium compounds, Peroxides, Chemical reactions.

Identifiers: Fluorodisulfates, Potassium fluorodisulfate, Sodium fluorodisulfate, Ammonium fluorodisulfate.

Potassium and sodium fluorodisulfates were produced by the reaction of peroxydisulfuryl difluoride with the corresponding peroxydisulfates: M2S2O8 + S2O6F2 = 2MS2O6F + O2 (M = Na or K). When M is ammonium, some NH4S2O6F was obtained together with much NH4S2O6F = NH4SO3F + SO3. (Author)

AD-641 218 **Field 7B, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Washington Univ., Seattle. Dept. of Chemistry.
PREPARATION OF BIS (FLUOROXY)DIFLUOROMETHANE.
Technical rept.
by Ronald L. Cauble, and George H. Cady. 14 Oct 66, 6p TR57
Contract Nonr-477 (16), ARPA order-26-60
Task 2

Descriptors: (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Oxyfluorides, Synthesis (Chemistry)), (*Fluorine compounds, Synthesis (Chemistry)), Carbon dioxide, Fluorine, Catalysis, Cesium compounds, Fluorides.

Identifiers: Bis (fluoroxy) difluoromethane.

Bis (fluoroxy) difluoromethane, CF2 (OF)2, was produced by the reaction of fluorine with carbon dioxide in the presence of cesium fluoride at room temperature. (Author)

AD-641 219 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
Washington Univ., Seattle. Dept. of Chemistry.
REACTIONS OF PENTAFLUOROSULFUR HYPOFLUORITE WITH Cl2, Br2, I2, NO, NO2 AND PF3.
Technical rept.
by B. W. Tattershall, and George H. Cady. 14 Oct 66, 10p TR-58
Contract Nonr-477 (16), ARPA order-26-60
Task 2

Descriptors: (*Sulfur compounds, Reduction (Chemistry)), (*Oxyfluorides, Reduction (Chemistry)), (*Fluorine compounds, Reduction (Chemistry)), Chlorine, Bromine, Iodine, Nitrogen compounds, Monoxides, Dioxides, Phosphorus compounds, Fluorides.

Identifiers: Pentafluorosulfur hypofluorite.

Pentafluorosulfur hypofluorite (SF5OF) was reduced to thionyl tetrafluoride (SOF4) at room temperature or below by Br2, I2, NO, NO2, or PF3. Chlorine did not react with SF5OF at temperatures up to 130C. (Author)

AD-641 220 **Field 7B, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Washington Univ., Seattle. Dept. of Chemistry.
SOME NEW REACTIONS OF TRIFLUOROMETHANE SULFENYL (CF3S) COMPOUNDS.
Technical rept.,
by B. W. Tattershall, and George H. Cady. 14 Oct 66, 11p TR-59
Contract Nonr-477 (16), ARPA order-26-60
Task 2

Descriptors: (*Sulfur compounds, Chemical reactions), (*Halogenated hydrocarbons, Chemical reactions), (*Fluorine compounds, Chemical reactions), Synthesis (Chemistry), Chlorides, Photochemistry, Infrared radiation, Mercury compounds, Phosgene.

Identifiers: Trifluoromethane sulfenyl compounds.

Various reactions were allowed to occur which offered possibilities of producing the substance CF3SCOCl. A substance obtained in low yield by the reaction of CF3SCl with CO had infrared and mass spectra of the type expected for CF3SCOCl. The substance was not definitely identified. Various combinations shown below in equations were tried. The principal products are shown at the right. Those in parentheses were not definitely identified but there is good reason to feel that they were formed. 2CF3SCl + CO + photon = CF3SSCF3 + COCl2 + CF3SSCF3 + (COCl)2 + photon yields CF3SCl + 2CO; 3 (CF2S)2Hg + COCl2 yields CF3SHgCl + (CF3S)2CS: CF3SH + COCl2 at 100C yields No reaction. (Author)

IS-1356 **Field 7B, 7D**
CFSTI Prices: HC$5.00 MF$1.00
Iowa State Univ. of Science and Technology, Ames.
HEATS OF DILUTION OF SOME AQUEOUS RARE-EARTH CHLORIDE SOLUTIONS AT 25 DEG C,
by C. W. De Kock, and F. H. Spedding. Feb 65, 166p
Contract W-7405-eng-82

Descriptors: (*Rare earths, Chlorides), (*Chlorides, Heat of solution).

For abstract, see NSA 20 21.

N66-31378 **Field 7B**
CFSTI Prices HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. Of Chemistry.
X-RAY DIFFRACTION ANALYSIS OF COHENITE FROM IRON METEORITES.
by M. E. Lipschutz. 1966, 32p NASA-CR-76400
Contract NGR-15-005-021

Descriptors: *Cohenite, *Meteorite, *Shock sensitivity, *X-ray diffraction, Crystal, Diffraction, Metallography, Microscopy, Odessa meteorite, Pressure, Recrystallization, Scale, Sensitivity, Shock, Wave, X-ray.

For abstract, see STAR 04 17.

N66-31860 **Field 7B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
CHEMICAL REACTIONS OF CARBIDES, NITRIDES, AND DIBORIDES OF TITANIUM AND ZIRCONIUM AND CHEMICAL BONDING IN THESE COMPOUNDS.
by W. H. Philipp. Aug 66, 22p NASA-TN-D-3533

Descriptors: *Chemical reaction, *Titanium compound, *Zirconium compound, Bonding, Carbide, Chemical, Diboride, High temperature, Metal, Nitride, Periodic group iva, Reaction, Refractory, Titanium, Transition, Zirconium.

For abstract, see STAR 04 17.

N66-37207 **Field 7B**
CFSTI Prices HC$4.00 MF$0.75
Georgia Inst. Of Tech., Atlanta. Engineering Experiment Station.
CHEMICAL REACTIVITY OF HYDROGEN, NITROGEN, AND OXYGEN ATOMS AT TEMPERATURES BELOW 100 DEG K FINAL TECHNICAL REPORT, 1 DEC. 1962 - 31 DEC. 1965.
by H. A. Mc gee Jr. Jul 66, 106p NASA-CR-78022
Grant NSG-337

Descriptors: *Chemical reaction, *Cryogenic temperature, *Hydrogen atom, *Nitrogen atom, *Oxygen atom, Analysis, Atmosphere, Atom, Carbon, Chemical, Chemistry, Comet, Cryogenic, Gas, Hydrogen, Inlet, Liquid, Mass, Nitrogen, Oxygen, Planetary, Reaction, Solid, Spectrometer, Surface, System, Temperature.

For abstract, see STAR 04 22.

AD-640 702 **See Field 19A**

AD-640 743 **See Field 7D**

AD-640 777 **See Field 7D**

AD-641 212 **See Field 7D**

NBS-TN-400 **See Field 7D**

7C. ORGANIC CHEMISTRY

AD-457 286 **Field 7C**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough, (England).
JOINT SYMPOSIUM ON MODERN METHODS OF ANALYSIS OF ORGANIC COMPOUNDS, EINDHOVEN, NETHERLANDS, 20-23 MAY 1964,
by J. R. Webb. Aug 64, 18p Technical note TN-CPM-81

Descriptors: (*Chemical analysis, Symposia), (*Organic compounds, Symposia), (*Symposia, Chemical analysis), Chromatographic analysis, Microanalysis, Volumetric analysis, X-ray diffraction analysis, Nuclear magnetic resonance, Mass spectroscopy, Spectra (Infrared), Colorimetric analysis, Gravimetric analysis, Quantitative analysis, Mixtures, Netherlands, Germany.

The author attended the Symposium jointly organized by the Koninklijke Nederlandse Chemische Vereniging (Sectie voor Analytische Chemie), and the Gesellschaft Deutscher Chemiker (Fachgruppe Analytische Chemie). A short account of the proceedings is given together with notes on some of the research papers read. (Author)

AD-640 547 **Field 7C, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Institute for Organic Chemistry, TNO, Utrecht (Netherlands).
STUDIES IN IVth GROUP ORGANOMETALLIC CHEMISTRY. XVI. SYNTHESIS OF ORGANOGERMANIUM COMPOUNDS CONTAINING THE p-PHENYLENE GROUP. SOME INFRARED CHARACTERISTICS OF p-PHENYLENE DERIVATIVES OF SILICON, GERMANIUM, TIN AND LEAD.
Technical note,
by A. J. Leusink, J. G. Noltes, H. A. Budding, and G. J. M. Van Der Kerk. 20 Mar 64, 21p TN-8
Contract AF 61 (052)-218
See also AD-640549.

Descriptors: (*Metalorganic compounds, Polymers), (*Polymers, Germanium compounds), (*Germanium compounds, Polymerization), Aromatic compounds, Condensation reactions, Chlorine compounds, Spectra (Infrared), Chemical analysis, Molecular weight, Silanes, Tin compounds, Lead compounds, Band spectrum, Netherlands.

Identifiers: Phenylene germanes, Germanes, Metalorganic polymers, Organotin compounds, Organoled compounds.

A few oligomeric and polymeric p-phenylenegermanes have been prepared by Wurtz-type condensation reactions from p-chlorophenyl and chlorogermanes. The oligomerio and polymeric products obtained have been characterized by infrared spectroscopy, elementary analysis and molecular weight determinations. Infrared spectra in the rocksalt region of phenyl and p-phenylene deriva-

tives of silicon, germanium, tin and lead are discussed. The spectra of the p-phenylene compounds show some characteristic absorption bands shifting to lower frequencies as the weight of the metal atoms in the molecule increases. (Author)

AD-640 548 **Field 7C, 11I**
CFSTI Prices: HC$1.60 MF$0.50
Institute for Organic Chemistry, TNO, Utrecht (Netherlands).
STUDIES IN IVth GROUP ORGANMETALLIC CHEMISTRY. IX. SYNTHESIS OF ORGANOSILICON COMPOUNDS AND POLYMERS CONTAINING THE p-PHENYLENE GROUP.
Technical note,
by H. G. Noltes, and G. J. M. Van Der Kerk. 26 Feb 62, 20p TN-6
Contract AF 61 (052)-218

Descriptors: (*Metalorganic compounds, Polymers), (*Polymers, Silanes), (*Silanes, Synthesis (Chemistry)), Aromatic compounds, Condensation reactions, Spectra (Infrared), Chemical analysis, Thermogravimetric analysis, Molecular weight, Thermal stability, Netherlands.

Identifiers: Phenylene silanes.

A number of oligomeric p-phenylenesilanes containing 2-6 silicon atoms per molecule and a series of low molecular weight poly-p-phenylenesilanes (n ± 10-30) were prepared by Wurtz-type condensation reactions involving appropriate combinations of p-chlorophenyl- and chlorosilanes. The polymeric products were characterized by infrared spectroscopy, analytical and thermogravimetric data, and number-average molecular weights, the low value of which is presumably caused by participation of the solvent (toluene) in the reaction. The polymers stated to lose weight at temperatures varying from 310C to 485C. (Author)

AD-640 549 **Field 7C, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Institute for Organic Chemistry, TNO, Utrecht (Netherlands).
STUDIES IN IVth GROUP ORGANOMETALLIC CHEMISTRY. XII. LINEAR POLYADDITION POLYMERS DERIVED FROM p-PHENYLENE-BIS- (DIMETHYLTIN HYDRIDE) AND DIPHENYLTIN DIHYDRIDE.
Technical note,
by A. J. Leusink, J. G. Noltes, and G. J. M. Van Der Kerk. 24 Dec 63, 17p TN-7
Contract AF 61 (052)-218
See also AD-640 548.

Descriptors: (*Metalorganic compounds, Polymers), (*Polymers, Tin compounds), (*Tin compounds, Polymerization), Hydrides, Alkenes, Alkynes, Lead compounds, Germanium compounds, Polyester plastics, Polyamide plastics, Netherlands.

Identifiers: Organotin compounds, Metalorganic polymer.

The preparation and characterization of linear organometallic polymers containing tin or tin and lead in the polymer main chain is described. These polymers were obtained by polyaddition reactions from p-phenylene-bis- (dimethyltin hydride) and various di-olefinic, acetylenic and di-acetylenic compounds. Reactions of this novel organotin hydride were carried out with p-styrenyl derivatives of germanium, tin and lead, leading to monomeric compounds containing four hydrocarbon-linked metal atoms. Furthermore, linear polyesters and polyamides containing organotin radicals in the polymer backbone were prepared from diphenyltin dihydride and difunctionally-unsaturated esters and amides. (Author)

AD-640 550 **Field 7C**
CFSTI Prices: HC$1.10 MF$0.50
Institute for Organic Chemistry TNO, Utrecht (Netherlands).
TRIPHENYLSILOXY DERIVATIVES OF BIS-CYCLOPENTADIENYL TITANIUM.
Technical note,
by J. G. Noltes, and G. J. M. Van der Kerk. 1 Aug 61, 4p TN-5
Contract AF 61 (052)-218

Descriptors: (*Metalorganic compounds, *Titanium compounds), (*Siloxanes, Metalorganic compounds), Chlorides, Cyclopentenes, Dienes, Synthesis (Chemistry), Netherlands.

Identifiers: Triphenylsiloxy bis (cyclopentadienyl) titanium chloride, Bis (triphenylsiloxy) bis (cyclopentadienyl) titanium.

Contrary to a report in the literature one or two chlorine atoms in bis-cyclopentadienyl titanium dichloride may be replaced by triphenylsiloxy groups with retention of the cyclopentadienyl groups. Orange-colored triphenylsiloxy-bis-cyclopentadienyl titanium chloride (m.p. 210-212C) and yellow-colored bis-triphenylsiloxy-bis-cyclopentadienyl titanium (m.p. 208-210C) were isolated in good yield. (Author)

AD-640 551 **Field 7C, 11I**
CFSTI Prices: HC$1.60 MF$0.50
Institute for Organic Chemistry TNO, Utrecht (Netherlands).
STUDIES IN IVth GROUP ORGANOMETALLIC CHEMISTRY. VIII. SYNTHESIS OF LINEAR ORGANOTIN POLYMERS FROM ORGANOTIN DIHYDRIDES AND ACETYLENIC COMPOUNDS.
Technical note,
by J. G. Noltes, and G. J. M. Van der Kerk. 1 Jul 61, 13p TN-4
Contract AF 61 (052)-218
See also AD-640 553.

Descriptors: (*Polymers, Metalorganic compounds), (*Metalorganic compounds, Chemical properties), (*Tin compounds, Polymers), Synthesis (Chemistry), Polymerization, Hydrides, Alkynes, Dienes, Cycloalkenes, Netherlands.

Identifiers: Organotin compounds, Metalorganic polymers, Stanna cycloheptadienes.

Linear organotin polymers with molecular weights in the range of 45000 to 100000 were obtained by poly-addition reactions involving organotin dihydrides and alpha, omega-diynes, such as hexadiyne-1,5, nonadiyne-1,8, and 1,4-diethynylbenzene. A number of 1-stannacycloheptadiene-2,6 derivatives (cyclic monomers derived from hexadiyne-1,5) were isolated. (Author)

AD-640 552 **Field 7C, 11I**
CFSTI Prices: HC$1.60 MF$0.50
Institute for Organic Chemistry TNO, Utrecht (Netherlands).
STUDIES IN IVth GROUP ORGANOMETALLIC CHEMISTRY. VI. PREPARATION AND POLYMERIZATION OF IVth GROUP ORGANOMETALLIC DERIVATIVES OF STYRENE AND METHYLSTYRENE.
Technical note,
by J. G. Noltes, H. A. Budding, and G. J. M. Van der Kerk. 29 Apr 60, 15p TN-2
Contract AF 61 (052)-218
See also AD-640 553.

Descriptors: (*Polymers, Metalorganic compounds), (*Metalorganic compounds, Chemical properties), (*Styrenes, Metalorganic compounds), Silanes, Germanium compounds, Tin compounds, Lead compounds, Synthesis (Chemistry), Polymerization, Catalysis, Styrene plastics, Netherlands.

Identifiers: Germanes, Organotin compounds, Organolead compounds, Methyl styrenes, Metalorganic polymers.

The preparation of a series of IVth group organometallic vinyl monomers derived from styrene and a-methylstyrene, respectively, is described. Thermal or radical-initated polymerization of the styrene derivatives yielded transparent, solid organometal-substituted polystyrenes. The monomers of the general structure p- (CH3)3M (IV)-C6H4-CH-CH2 display appreciably different rates of radical-initiated polymerization, i.e. in the order Pb > Si > C > Ge > Sn. (Author)

AD-640 553 **Field 7C, 11I**
CFSTI Prices: HC$1.60 MF$0.50
Institute for Organic Chemistry TNO, Utrecht (Netherlands).
STUDIES IN IVth GROUP ORGANOMETALLIC CHEMISTRY. VII. SYNTHESIS OF SOME HETERO-POLYMERS CONTAINING GERMANIUM, TIN, AND LEAD IN THE MAIN POLYMER CHAIN.
Technical note,
by J. G. Noltes, and G. J. M. Van Der Kerk. 30 Nov 60, 15p TN-3
Contract AF 61 (052)-218
See also AD-640 552.

Descriptors: (*Polymers, Metalorganic compounds), (*Metalorganic compounds, Chemical properties), (*Germanium compounds, Polymers), (*Tin compounds, Polymers), (*Lead compounds, Polymers), Hydrides, Polymerization, Synthesis (Chemistry), Spectra (Infrared), Chemical analysis, Molecular weight, Styrene plastics, Vinyl plastics, Netherlands.

Identifiers: Germanes, Organolead compounds, Organotin compounds, Metalograngic polymers.

It was shown that di-p-styrenyl derivatives of germanium, tin, and lead as well as 1,4-divinylbenzene and 3,9-divinylspirobi (meta-dioxane) react with diphenyltin dihydride to yield linear poly-addition polymers containing tin or tin and germanium or lead in the main polymer chain. The polmeric products were characterized by infrared spectroscopy, analytical data and molecular weights, the latter varying from 14.000 for the lead-containing polymer to 110.000 for the 1,4-divinylbenzene adduct. Reactions of triphenyltin hydride and diphenyltin dihydride with mono- and di-p-styrenyl derivatives of germanium, tin, and lead yielding monomeric compounds containing two and three hydrocarbon-linked metal atoms were carried out as well. (Author)

AD-640 554 **Field 7C, 11I**
CFSTI Prices: HC$4.00 MF$0.75
Institute for Organic Chemistry, T.N.O., Utrecht (Netherlands).
THE SYNTHESIS OF IVth GROUP ORGANOMETALLIC POLYMERS AND RELATED COMPOUNDS.
Final rept.,
by A. J. Leusink, J. G. Noltes, H. A. Budding, and G. J. M. Van der Kerk. Jun 64, 103p
Contract AF 61 (052)-218

Descriptors: (*Metalorganic compounds, *Polymers), (*Silanes, Polymers), (*Germanium compounds, Polymers), (*Tin compounds, Polymers), (*Lead compounds, Polymers), Hydrides, Condensation reactions, Polymerization, Chlorine compounds, Synthesis (Chemistry), Heterocyclic compounds, Alkenes, Alkynes, Esters, Amides, Styrenes, Isoprene, Acrylic resins, Titanium compounds, Aromatic compounds, Cycloalkenes, Infrared spectroscopy, Netherlands.

Identifiers: Germanes, Organolead compounds, Organotin compounds, Metalorganic polymers.

The synthesis and characterization are described of linear polymers, having a carbon chain regularly interrupted by the Group IV elements silicon, germanium, tin or lead. Such polymers were obtained by means of: (1) poly-addition reactions involving an organotin dihydride and either a dienic, a diynic

or a monoynic compound; (2) Wurtz-type polycondensations involving appropriate combinations of p-chlorophenyl and chloro derivatives of the Group IV elements. The synthesis and polymerization of vinyl-type IVth group organometallic monomers is dealt with briefly. Furthermore, interesting IVth group metal-containing heterocycles were prepared and also a few polymers, containing in addition to Group IV atoms other hetero-elements in their backbone. All polymer-forming reactions have been studied by carrying out model reactions on a low-molecular weight level. (Author)

AD-640 566 **Field 7C, 11I**
CFSTI Prices: HC$4.60 MF$0.50
Birkbeck Coll., London (England).
RESEARCH ON HIGH-TEMPERATURE METALLO-ORGANIC COMPOUNDS AND POLYMERS.
Final technical rept.,
by D. C. Bradley. 12 Nov 59, 43p
Contract AF 61 (052)-174

Descriptors: (*Polymers, Metalorganic compounds), (*Metalorganic compounds, Synthesis (Chemistry)), (*Heat-resistant materials, Metalorganic compounds), Amides, Piperidines, Titanium compounds, Zirconium compounds, Vanadium compounds, Tantalum compounds, Niobium compounds, Stereochemistry, Polymerization, Molecular weight, Hydrolysis, Spectra (Infrared), Great Britain.

Identifiers: Metalorganic polymers.

A number of new dialkylamido-derivatives of transition metals have been synthesized and their physical properties studied. (Author)

AD-640 715 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Miami Univ., Fla. Dept. of Pediatrics.
STUDIES IN THE CYCLOBUTANE SERIES.
Final rept., 2 Oct 63-1 Sep 66,
by Irving Lillien. 1 Sep 66, 13p
Grant AF-AFOSR-123-63
Proj. AF-9762
Task 976202
AFOSR-66-2002

Descriptors: (*Cyclobutanes, *Stereochemistry), Synthesis (Chemistry), Molecular isomerism, Esters, Chemical equilibrium, Amines, Alcohols, Nuclear magnetic resonance, Molecular structure.

Identifiers: Isopropyl cyclobutanes, Isopropyl cyclobutanols, Isopropyl cyclobutylamines, Molecular conformations.

The primary accomplishments included the synthesis and study of derivatives of the 3-isopropylcyclobutane syste which provided successful ingress to means for defining conformational consequences of nonplanarity. Cis and trans 3-isopropylcyclobutanecarboxylate esters were equilibrated: cis and trans 3-isopropylcyclobutylamines and cis and trans 3-isopropylcyclobutanols were synthesized and configurational assignments made by reference to equilibrated ester. NMR spectra of the above series of compounds, and the equilibration data, strongly support the conclusion that the isopropyl group is effective as a 'holding' group in this system, the alcohols and amines appear to be conformationally homogeneous. Deamination of the cis and trans amines produce a mixture of the same five products but in significantly different ratios. Thus, there is little or no likelihood of a common intermediate, classical or non-classical, and results are interpreted in terms of concertion involving the conformational distinctions between equatorial and axial amino groups. (Author)

AD-640 796 **Field 7C**
CFSTI Prices: HC$4.60 MF$0.50
Birkbeck Coll., London (England). Dept. of Chemistry.
RESEARCH ON SILICON AND PHOSPHORUS DERIVATIVES OF VARIOUS NITROGEN COMPOUNDS.
Final technical rept.,
by Robert A. Shaw. 31 Jan 62, 49p
Contract AF 61 (052)-175
See also AD 640 797.

Descriptors: (*Organic nitrogen compounds, Chemical reactions), (*Silanes, Synthesis (Chemistry)), (*Organic phosphorus compounds, Synthesis (Chemistry)), Phosphites, N-heterocyclic compounds, Triazines, Sulfides, Selenides, Amines, Lithium compounds, Great Britain.

Identifiers: Dichloro ethylanilino triazines, Dichloro diethylanilino triazines, Diphenyl phosphorochloridite, Hexamethyldisilazyl lithium, Phosphino triazines, Phosphinato triazines, Silylamines.

Trialkyl phosphites or diphenyl alkyl phosphites react with cyanuric chloride to give alkyl halides and 2,4,6-tris (dialkylphosphonato)-s-triazines or 2,4,6-tris (diphenylphosphonato)-s-triazines. Triphenyl phosphite reacts with cyanuric chloride to form triphenyl cyanurate and diphenylphosphorochloridite, (PhO)2PCl. Improved methods of synthesis of 2,4,6-tris (diphenylphosphino)-s-triazine were investigated and the trisulphide and triselenide were prepared. Cyanuric chloride reacts with NN-diethylaniline to give 2,4-dichloro-6-N-ethylanilino-s-triazine and 2,4-dichloro-6-p-NN-diethylanilino-s-triazine. The compounds tris (trimethylsilyl)amine, bis (trimethylsilyl) - triphenylsilylamine, dimethylchlorosilylbis (trimethylsilyl)amine, diethylchlorosilylbis (trimethylsilyl)amine, and diphenylchlorosilylbis (trimethylsilyl)amine have been prepared from reactions of hexamethyldisilazyl-lithium. (Author)

AD-640 797 **Field 7C**
CFSTI Prices: HC$4.60 MF$0.50
Birkbeck Coll., London (England). Dept. of Chemistry.
RESEARCH ON SILICON AND PHOSPHORUS DERIVATIVES OF VARIOUS NITROGEN COMPOUNDS.
Technical note,
by Robert A. Shaw. 31 Jan 61, 42p
Contract AF 61 (052)-175
See also AD-640 796.

Descriptors: (*Organic nitrogen compounds, Chemical reactions), (*Silanes, Synthesis (Chemistry)), (*Organic phosphorus compounds, Synthesis (Chemistry)), Lithium compounds, Metalorganic compounds, Amines, Phosphites, N-heterocyclic compounds, Phosphines, Triazines.

Identifiers: Phosphinato triazines, Cyanuric chloride, Diethyl anilines, Silazanes, Hexamethyl disilazyl lithium, Silylamines.

The new compound hexamethyldisilazyl lithium has been prepared in solution and its reactions with a variety of halogen derivatives are described. Reactions of cyanuric chloride with trialkyl phosphites and other tervalent phosphorus compounds have been investigated and several new phosphorus derivatives of s-triazine are reported. The reaction of cyanuric chloride with diethylaniline is reported, and the preparation of silicon derivatives of s-triazine are under investigation. (Author)

AD-640 955 **Field 7C**
Not available from CFSTI.
Oregon Univ., Eugene. Dept. of Chemistry.
8-AZACYCL (2.2.2)AZINE,
by V. Boekelheide, and N. A. Fedoruk. 7 Apr 66, 4p
Grant DA-ARO (D)-31-124-G377
AROD-3719:4
Availability: Published in Proceedings of the National Academy of Sciences v55 n6 p1385-7 Jun 1966.

Descriptors: (*N-heterocyclic compounds, Chemical reactions), (*Azines, Chemical reactions), Carboxylic acids, Alcohols, Synthesis (Chemistry), Polycyclic compounds.

Identifiers: Azacycloazines.

Treatment of 1-benzoyl-2-phenyl-4,8-diazapentalene with acetylene dicarboxylate yielded 1-phenyl-2-benzoyl-5,6-dicarbomethoxy-8-azacycl (2.2.2)azine; from which it was possible to produce, in a stepwise fashion, 1-phenyl-2-benzoyl-5,6-dicarboxy-8-azacycl (2.2.2)azine, 1-phenyl-2-benzoyl-8-azacycl (2.2.2)azine, and 1-phenyl-8-azacycl (2.2.2)azine.

AD-641 120 **Field 7C, 6L, 11A**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
GAS-LIQUID CHROMATOGRAPHY OF THE ALKYL ALPHA CYANOACRYLATES.
Technical rept.,
by Duane E. Bartak, and R. K. Kulkarni. Aug 66, 15p TR-6614
Proj. 3A025601A821-01-097

Descriptors: (*Adhesives, Chromatographic analysis), (*Acrylic resins, Gas chromatography), (*Nitriles, Gas chromatography), Impurities, Molecular weight, Test methods, Esters.

Identifiers: Cyano acrylates, Tissue adhesives.

The purity of the cyanoacrylate monomers was estimated by gas-chromatographic technique. Some of the impurities, like diglyme, cyanoacetates, were identified by noting the retention volumes. A plot of the retention volumes vs. number of carbons in the alkyl part of the cyanoacrylates was found to be linear; however, the use of temperature programming to obviate the broadening of the peaks for compounds having higher retention volumes was not successful, due to the shifting of the base line with increase in temperature. (Author)

AD-641 280 **Field 7C, 11I**
Not available from CFSTI.
Explosives Research and Development Establishment, Waltham Abbey (England).
REGULAR ALKYLENE ETHER COPOLYMERS,
by T. P. Hobin. Jan 66, 8p Offprint-66/11, WAC/172/080
Availability: Published in Polymer v7 p367-71 1966.

Descriptors: (*Polymers, *Ethers), (*Glycols, Polymerization), Catalysis, Condensation reactions, Copolymerization, Melting point, Crystallization, Great Britain.

Identifiers: Polyethers.

Mixed triglycols, HO (CH2)xO (CH2)yO (CH2)xOH, where x is not less than six, undergo acid-catalysed polycondensation to give regular alkylene either copolymers (CH2)xO (CH2)yO (CH2)xO)n. Melting temperatures and crystallization rate data were obtained for several of these copolymers. (Author)

NBS-TN-405 **Field 7C**
CFSTI Prices: HC$0.60 MF$0.75
National Bureau of Standards, Washington, D. C. Inst. for Materials Research.
ORGANIC CHEMISTRY; AIR POLLUTION STUDIES; KINETIC BEHAVIOR OF SUGARS IN SOLUTION; CARBON-14- AND TRITIUM-LABELED CARBOHYDRATES; CHARACTERIZATION OF CHEMICAL STRUCTURES, PHENYLHYDRAZONO-PHENYLAZO TAUTOMERISM; SYNTHESIS OF RESEARCH MATERIALS, CY-

CLOPENTITOLS AND RELATED SUBSTANCES: NOVEL RESEARCH MATERIALS; STANDARD REFERENCE MATERIALS (ORGANIC) JUL 1965 THROUGH JUNE 1966.
Technical note,
by Horace S. Isbell. 30 Sep 66, 123p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 2002 $0.60. See also NBS-TN-274.

Descriptors: (*Organic compounds, Chemical analysis), (*Chemical analysis, Reviews), Air pollution, Polycyclic compounds, Photochemistry, Carbohydrates, Stereochemistry, Reaction kinetics, Labeled substances, Chromatographic analysis, Hydrazine derivatives, Molecular isomerism, Organic nitrogen compounds, Alcohols, Metalorganic compounds, Standards.

The document constitutes the second annual progress report of the Organic Chemistry Section of the NBS Analytical Chemistry Division.

N66-30432 **Field 7C, 14B**
CFSTI Prices HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
THE USE OF THE X-RAY FLUORESCENCE SPECTROGRAPHY FOR THE ANALYSIS OF SOLUTIONS.
L'application De La Spectrographie De Fluorescence X A L'analyse Des Solutions
by G. Vos. 1966, 20p EUR-2951.F
In French, English Summary

Descriptors: *Chemical analysis, *Organic liquid, *X-ray fluorescence, Analysis, Aqueous, Chemical, Fluorescence, Liquid, Method, Organic, Radiation, Scattering, Solution, Technique, X-ray.

For abstract, see STAR 04 17.

N66-30593 **Field 7C**
CFSTI Prices HC$2.00 MF$0.50
Miami Univ., Coral Gables, Fla.
STEREOSELECTIVE SYNTHESIS OF OPTICALLY ACTIVE ASPARTIC ACID FROM DERIVATIVES OF FUMARIC ACID AND MALEIC ACID.
by K. Harada, and K. Matsumoto. 1966, 35p
NASA-CR-76251
Grant NSG-689
Submitted For Publication Its Contrib. No. 055

Descriptors: *Amino acid, *Aspartic acid, *Stereochemistry, *Synthesis, Acid, Activity, Alpha, Amine, Amino, Aspartic, Benzyl, Compound, Derivative, Maleic, Methyl, Optical.

For abstract, see STAR 04 17.

N66-30614 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
Miami Univ., Coral Gables, Fla. Inst. Of Molecular Evolution.
OPTICAL RESOLUTION AND CONFIGURATION OF TRANS-2,3-EPOXYBUTYRIC ACID.
by K. Harada, and J.-I. Oh-hashi. 1966, 16p
NASA-CR-76233
Grant NSG-689
Submitted For Publication Its Contrib. No. 061 Of The Inst. Of Mol. Evolution

Descriptors: *Ammonolysis, *Butyric acid, *Resolution, Acid, Amino, Brucite, Butyric, Charcoal, Configuration, Derivative, Determination, Epoxy, Hydrogenolysis, Mechanism, Optical, Palladium, Treatment.

For abstract, see STAR 04 17.

N66-31890 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. School Of Medicine.
CALCULATION OF MOLECULAR FORMULAS IN HIGH-RESOLUTION MASS SPECTROMETRY.
by J. Lederberg. 1964, 24p NASA-CR-76467
Grant NSG-81-60
Append. To "structure Elucidation Of Natural Products By Mass Spectrometry. Volume Ii- Steroids, Terpenoids, Sugars, And Miscellaneous Classes" San Francisco, Holden-day, Inc., 1964 P 279-297

Descriptors: *Algorithm, *Computer, *Mass spectrometry, Carbon, Decimal, Formula, High resolution, Hydrogen, Mass, Molecular, Nitrogen, Organic, Oxygen, Residue, Spectrometry, Weight.

For abstract, see STAR 04 17.

N66-31913 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
Chemical Lab. Rvo-tno, Rijswijk (Netherlands).
SYNTHESES AND TOXICITIES OF SOME SERIES OF CHOLINESTERASE INHIBITION AGENTS. XIII - THE PREPARATION OF DIALKYL PHOSPHOROFLUORIDATES USING PICRYL FLUORIDE OF 2,4-DINITROFLUORBENZENE.
by H. L. Boter. May 66, 12p TDCK-45558
Its Rept.-1966-9

Descriptors: *Choline, *Nitro compound, *Organic chemistry, *Phosphorus compound, *Synthesis, *Toxicity, Agent, Alkyl, Chemistry, Cholinesterase, Compound, Fluoro, Inhibition, Nitro, Organic, Picrate, Salt.

For abstract, see STAR 04 17.

N66-32252 **Field 7C**
CFSTI Prices HC$3.25 MF$1.00
Southern Research Inst., Birmingham, Ala.
A STUDY OF POLYMERS CONTAINING SILICON- NITROGEN BONDS ANNUAL SUMMARY REPORT, MAY 4, 1965 - MAY 3, 1966.
by R. E. Burks Jr, E. R. Covington, and T. W. Ray. 1966, 160p NASA-CR-76654
Contract NAS8-20190
Its Rept.-12

Descriptors: *Aerospace technology, *High temperature environment, *Nitrogen, *Polymer chemistry, *Silicon, Aerospace, Amine, Bond, Chemistry, Coating, Curing, Elastomer, Environment, Epoxy, High temperature, Phenylene, Polymer, Radiation, Resin, Stability, Technology, Thermal, Titanium.

For abstract, see STAR 04 17.

N66-37218 **Field 7C**
CFSTI Prices HC$2.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
AN ASSOCIATED SOLVENT THEORY OF POLYMER SOLUTIONS.
by W. B. Brown, and W. D. Taylor. 16 Feb 66, 32p NASA-CR-78262, WIS-TCI-160
Grant NSG-275-62

Descriptors: *Polymer, *Solvent, *Thermodynamic property, Association, Diethyl, Dilution, Isopropyl, Ketone, Liquid, Mixture, Molecule, Nonpolar, Polar, Polypropylene, Pressure, Property, Theory, Thermodynamic, Vapor.

For abstract, see STAR 04 22.

N66-37287 **Field 7C**
CFSTI Prices HC$2.00 MF$0.50
Iit Research Inst., Chicago, Ill. Technology Center.
PURIFICATION OF GEMINI FUEL CELL WATER BY ION EXCHANGE CHROMATOGRAPHY FINAL REPORT, 13 APR. - 12 NOV. 1965.
by H.J. Oneill. 22 Dec 65, 40p NASA-CR-65530, IITRI-U6019-7
Contract NAS9-4107

Descriptors: *Chromatography, *Fuel cell, *Gemini project, *Ion exchange, *Water purification, Anion, Bed, Cell, Charcoal, Exchange, Fuel, Ion, Purification, Resin, Water, Weight.

For abstract, see STAR 04 22.

N66-37304 **Field 7C**
CFSTI Prices HC$2.50 MF$0.50
American Univ., Washington, D. C.
INVESTIGATION OF ELECTROCHEMISTRY OF HIGH ENERGY COMPOUNDS IN ORGANIC ELECTROLYTES. BIBLIOGRAPHY ON PROPYLENE CARBONATE, GAMMA- BUTYROLACTONE, AND RELATED SUBJECTS SUPPLEMENT TO THIRD PROGRESS REPORT.
by R. T. Foley, and J. P. Marciniszyn Jr. 12 Sep 66, 55p NASA-CR-78235
Contract NGR-09-003-005

Descriptors: *Bibliography, *Electrochemistry, *Organic compound, Compound, Cyclic, Electrolyte, Ester, High energy, Organic, Physical, Property, Solvent.

For abstract,see STAR 04 22.

AD-640 563 **See Field 7D**

AD-640 564 **See Field 7D**

AD-640 565 **See Field 7B**

AD-640 893 **See Field 7B**

AD-640 903 **See Field 7D**

AD-640 911 **See Field 6A**

AD-640 923 **See Field 7B**

AD-640 948 **See Field 7E**

AD-641 102 **See Field 7D**

AD-641 141 **See Field 20L**

AD-641 151 **See Field 7E**

AD-641 218 **See Field 7B**

AD-641 220 **See Field 7B**

PB-173 234 **See Field 7E**

7D. PHYSICAL CHEMISTRY

AD-454 420 **Field 7D, 10B**
CFSTI Price: HC$3.00
Electrochimica Corp., Menlo Park, Calif.
DIRECT AMMONIA-AIR FUEL CELL.
Final rept., 1 Jul 63-31 Aug 64,
by Robert E. Kuppinger. 31 Aug 64, 77p
Contract DA-36-039-AMC-03245 (E)
Proj. DA-1G6-22001-A-053-04

Descriptors: (*Fuel cells, Ammonia), Oxidation, Reaction kinetics, Voltage, Measurement, Effectiveness, Electric currents, Performance (Engineering), Temperature, Statistical analysis, Analysis of variance, Electrochemistry, Electrodes.

A new type of direct oxidation ammonia fuel cell was investigated. This cell is based on the use of a non-aqueous fused hydroxide electrolyte matrix, and operates in the intermediate temperature range of 180-300 C. Studies have been carried out to determine the nature of the rate-controlling step in the kinetics of the anodic oxidation of ammonia. A new type of Ni/NiOOH reference electrode was developed for the measurement of single electrode potentials in experimental galvanic fuel cells employing this type of matrix electrolyte. In addition to various exploratory studies, two statistical analysis programs, using a full factorial design and

replicate blocks of cells, were applied to the electrochemical parameters of temperature, composition, current density, and cell 'aging.' During this study, operational cells were able to reach current densities of 100 to 120 mA/sq cm at cell EMF's of 0.5 to 0.6 volts. At practical levels of current density the direct ammonia fuel cell has an overall efficiency of about 60% compared to 30-35% for the indirect-type fuel cell. (Author)

AD-479 463 **Field 7D, 20I**
CFSTI Prices: HC$5.00 MF$1.00
Unified Science Associates, Inc., Pasadena, Calif.
STABLE DENSE COLD PLASMA.
Final rept., 20 Feb 61-19 Sep 65,
by S. Naiditch. Feb 66, 175p C-3
Contract Nonr-3437 (00)

Descriptors: (*Physical chemistry, Solutions), (*Plasma physics, Solutions), Sodium, Ammonia, Density, Conductivity, Magnetic properties, Hall effect, Glass, Surface properties, Cleaning, Contamination, Measurement, Spectroscopy, Chemical properties, Physical properties, Catalysis, Hydroxides, Sodium compounds.

We have established that sodium-ammonia solutions exist as stable dense gaseous plasmas at temperatures above 135C. These electronically-conducting gaseous solutions have been produced by dissolving metallic sodium in dense gaseous ammonia at 130 to 190C. The solutions, contained in glass, are under equilibrium with respect to mobile electrons, but metastable with respect to chemical oxidation. Useful lifetimes of an hour have been obtained before chemical reactions destroy the electronic character of the solutions. When concentrated, these gases have metallic reflectivity and are copper-gold colored, and in the less concentrated states are opaque dark blue colored. The studies of the principal physical chemical properties of sodium-ammonia solutions included measurements of electrical conductivity over an extended temperature range (-60 to + 190C), density (-60 to + 60), Hall coefficient, magnetic susceptibility, chemical stability, and reflection and transmission spectra (-40 to + 20). These studies, where indicated, have been made over extended temperature ranges and required the development of an extensive new technology. This technology included making highly pure sodium-ammonia solutions, refining inductive conductivity measuring techniques, developing precision glass blowing and evaluating glass cleaning methods. (Author)

AD-640 563 **Field 7D, 11I, 7C**
CFSTI Prices: HC$5.60 MF$0.75
Southampton Univ. (England). Dept. of Chemistry.
KINETIC STUDY OF ION-SENSITIZED TERMINATION OF RADICAL POLYMERISATION.
Technical rept.,
by E. A. S. Cavell. Jul 63, 60p
Contract AF 61 (052)-376
AFML-TDR-64-101

Descriptors: (*Polymerization, Reaction kinetics), (*Catalysts, *Perchlorates), (*Amides, Polymerization), Iron compounds, Vanadium compounds, Uranyl radicals, Salts, Photochemistry, Concentration (Chemistry), Chlorides, Sulfates, Thermodynamics, Great Britain.

Identifiers: Acrylamides, Ferric chloride, Ferric perchlorate, Ferric sulfate, Uranyl perchlorate, Vanadyl perchlorate.

Rates of linear termination of polymerisation by metal perchlorates (Fe, V, U) were measured at different temperatures and Arrhenius parameters determined. No correlation between rate constant and any thermodynamic property was found. Rate constants for termination by ferric chloride and sulphate were much greater than that for termination by ferric perchlorate. Uranyl perchlorate and ferric chloride were found to initiate polymerisation by a thermal mechanism. (Author)

AD-640 564 **Field 7D, 11I, 7C**
CFSTI Prices: HC$1.60 MF$0.50
Southampton Univ. (England).
KINETIC STUDY OF ION-SENSITIZED TERMINATIONS OF RADICAL POLYMERISATION.
Annual summary rept.,
by E. A. S. Cavell. 11 Jul 61, 14p
Contract AF 61 (052)-376

Descriptors: (*Polymerization, Reaction kinetics), (*Catalysis, Polymerization), (*Amides, Polymerization), Nitriles, Azides, Carboxylic acids, Concentration (Chemistry), Iron compounds, Perchlorates, Perchloric acid, Great Britain.

Identifiers: Acrylamides, Azo bis (Cyanopentanoic acids), Ferric perchlorate.

A kinetic study of the polymerisation of acrylamide initiated by the thermal catalyst 4-4'-azo-bis-4-cyanopentanoic acid showed that up to 10% conversions the rate of polymerisation is directly proportional to the concentration of monomer and to the square root of the concentration of catalyst. In the presence of ferric perchlorate and decimolar perchloric acid, however, the overall rate of polymerisation is reduced and the rate now becomes directly proportional to the first power of the catalyst concentration and inversely proportional to the concentration of ferric ions present. (Author)

AD-640 630 **Field 7D, 20I**
CFSTI Prices: HC$1.00 MF$0.50
Texas Univ., Austin. Dept. of Physics.
THE PHYSICS OF METASTABLE SYSTEMS.
Final rept., 1 Feb 65-31 Jan 66,
by W. W. Robertson. 31 Jan 66, 14p
Grant AF-AFOSR-273-65
Proj. AF-9750
Task 975002
AFOSR-66-2280

Descriptors: (*Helium group gases, *Atomic energy levels), Reaction kinetics, Transport properties, Dissociation, Recombination reactions, Glow discharges, Spectroscopy, Excitation, Probability, Helium, Neon, Plasma medium.

Results of studies in the following areas are briefly summarized: Collisional-radiative recombination of He (+) into dissociative states: temperature dependence of the rate of conversion of He (;) into He2 (+); atomic and molecular emission in the negative glow of a helium discharge; spectroscopic investigation of the helium-neon molecule; application of the Franck-Condon principle to molecular excitation by collision with excited atoms and molecules; Hornbeck-Molnar cross-sections for the n=3 states of helium; inelastic excitation transfer in helium. A cumulative list of publications generated under the contract is included.

AD-640 638 **Field 7D**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
THE ACCURACY OF RADIOACTIVATION ANALYSIS.
Physical sciences research papers,
by J. Paul Cali, Joseph R. Weiner, and Gregory C. Rocco. Jun 66, 10p AFCRL-PSRP-238,
AFCRL-66-411
Proj. AF-5620
Task 562003
Availability: Published in Proceedings, 1965 International Conference: Modern Trends in Activation Analysis.

Descriptors: (*Radioactivation analysis, Effectiveness), Errors, Statistical analysis, Decay schemes, Gamma-ray spectroscopy.

The accuracy of radioactivation analysis is subject to many systematic errors which may be grouped under these headings: factors related to (1) chemical manipulations, (2) irradiation, (3) nuclear constants, (4) counting and (5) others. Because an activation analysis can be performed in many ways, this discussion is limited to four analytical methods, A-D, which are defined and are primarily four different ways of analyzing trace elements by gamma spectrometry. For each of these methods the random error of each of the factors discussed above was evaluated as it may be applicable. Using a propagation of error treatment the total error to be expected for each of the four analytical methods was then estimated. The 2-sigma range of error is from plus or minus 14 to 120%, and this may be taken as a reasonable limit of accuracy for radioactivation analysis subject to the limitations quoted herein. Finally, it was shown how experimental accuracy data obtained from the analysis of standard materials compares with predicted errors. (Author)

AD-640 640 **Field 7D, 20H, 20J**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
REDUCTION OF THE FOURTH-ORDER ASYMMETRIC-ROTOR HAMILTONIAN.
Physical sciences research papers,
by F. X. Kneizys, J. N. Freedman, and S. A. Clough. 1 Nov 65, 9p AFCRL-PSRP-253,
AFCRL-66-513
Proj. AF-7670
Task 767003
Availability: Published in Journal of Chemical Physics v44 n7 p2552-6 Apr 1 1966.

Descriptors: (*Hamiltonian, *Molecular rotation), Momentum, Perturbation theory.

By use of the angular-momentum commutation relations, the fourth-order asymmetric-rotor Hamiltonian for molecules of orthorhombic symmetry has been considerably simplified. The number of rotational coefficients has been reduced to 19: three coefficients of second power, six coefficients of the fourth power, and 10 coefficients of sixth power in the angular momentum. (Author)

AD-640 676 **Field 7D**
Not available from CFSTI.
Texas Univ., Austin. Dept. of Chemistry.
HEAT-RELEASE PROFILES IN THE HIGH-TEMPERATURE OXIDATION OF ACETYLENE IN SHOCK WAVES,
by W. C. Gardiner Jr, W. G. Mallard, K. Morinaga, D. L. Ripley, and B. F. Walker. 31 Jan 66, 3p
AROD-3390:8
Availability: Published in The Journal of Chemical Physics v44 n12 p4653-4 Jun 15 1966.

Descriptors: (*Alkynes, Oxidation), (*Heat of reaction, Alkynes), High-temperature research, Shock waves.

Identifiers: Acetylenes.

AD-640 682 **Field 7D**
Not available from CFSTI.
South Carolina Univ., Columbia. Dept. of Chemistry.
ION-SOLVENT INTERACTION. DISPLACEMENT OF TETRAHYDROFURAN FROM A TERTIARY AMMONIUM CATION BY TRIPHENYLPHOSPHINE OXIDE,
by James B. Ezell, and W. R. Gilkerson. 14 Mar 66, 6p
Grant DA-ORD-31-124-61-G51
AROD-2913:8
Availability: Published in Journal of the American Chemical Society v88 n15 p3486-90 Aug 5 1966.

Descriptors: (*Complex compounds, *Chemical equilibrium), Ammonium compounds, Phosphine oxides, Benzenes, Furans, Organic solvents, Solutions, Molecular association, Electrical conductance.

Identifiers: Dichlorobenzenes, Tetrahydrofu-

ran, Dibutyl phosphine oxide, Tributyl ammonium picrates, Triphenyl phosphine oxide.

Cation-ligand association constants were determined by a conductance technique for tri-n-butylammonium cation with triphenylphosphine oxide in o-dichlorobenzene (ODCB) as solvent and in tetrahydrofuran (THF); di-n-butylphenylphosphine oxide in both ODCB and THF; THF as ligand in ODCB solvent. All measurements were carried out at 25. The changes in the association constants of the phosphine oxides as the solvent is changed from ODCB to THF can be accounted for (to within 5%) if a specifically solvating THF molecule in THF solvent is being displaced from the cation by the incoming phosphine oxide. The ligand association constants are interpreted as being measures of specific cation-solvent interaction and are applied to the problem of specific solvent effects on ion-pair dissociation in several solvents. (Author)

AD-640 705 **Field 7D, 20I, 21B**
CFSTI Prices: HC$3.00 MF$0.75
Lash Miller Chemical Labs., Univ. of Toronto (Ontario).
ENERGY DISTRIBUTION IN FLAMES AND ELECTRICAL DISCHARGES.
Final rept.,
by J. M. Deckers. Aug 66, 97p
Grant AF-AFOSR-375-65
Proj. AF-9750
Task 975002
AFOSR-66-2132

Descriptors: (*Flames, Energy), (*Plasma medium, Energy), (*Gas discharges, Energy), Hydrocarbons, Emissivity, Continuous spectrum, Ethylenes, Excitation, Glow discharges, Discharge tubes, Oxygen, Reaction kinetics, Canada.

It is shown that at low pressures the spectrum of the CH* and C2* emission is independent of flame parameters. Hence, the initial energy distribution is obtained. This energy distribution is then used to prove that the more than one reaction produces CH* in the ethylene flame. A theory is presented taking into account inelastic and reactive collision in the positive column of a DC glow discharge. The structure of the positive column near the anode is also analysed. A survey is presented of DC glow discharges through oxygen. (Author)

AD-640 721 **Field 7D**
Not available from CFSTI.
National Bureau of Standards, Washington, D. C.
ABSORPTION SPECTRUM OF SF6 IN THE FAR ULTRAVIOLET BY ELECTRON IMPACT,
by J. Arol Simpson, C. E. Kuyatt, and S. R. Mielczarek. 20 Oct 65, 2p
Research supported in part by ARPA, Proj. Defender.
Availability: Published in Journal of Chemical Physics v44 n12 p4403-4 Jun 15 1966.

Descriptors: (*Ultraviolet spectroscopy, *Electron bombardment), (*Sulfur compounds, Spectra (Visible + ultraviolet)), (*Fluorides, Spectra (Visible + ultraviolet)), Inelastic scattering, Probability, Absorption spectrum, Energy.

Identifiers: Sulfur hexafluoride.

Measurements of forward inelastic scattering of 400-eV electrons from sulfur hexafluoride (SF6) were made and used to derive relative ultraviolet-absorption cross sections. The relative values were normalized to an ultraviolet-absorption measurement at 23.00 eV. Agreement with additional uv measurements at 21.2 and 17.6 eV was excellent. Oscillator strengths for three absorption bands between 10 and 15 eV, as derived from the electron-scattering measurements, are in fair agreement with the corresponding values measured by uv absorption. The total oscillator strength for excitations up to 32 eV is found to be 15.3. (Author)

AD-640 738 **Field 7D**
Not available from CFSTI.
Army Electronics Command, Fort Monmouth, N. J. Inst. for Exploratory Research.
DYNAMIC POLARIZATION IN HEXAFLUOROBENZENE SOLUTIONS,
by E. H. Poindexter, J. R. Stewart, R. J. Runge, and D. D. Thompson. 15 Dec 65, 2p
Prepared in cooperation with Chevron Research Co., La Habra, Calif.
Availability: Published in The Journal of Chemical Physics v44 n10 p4059-60 May 15 1966.

Descriptors: (*Free radicals, Polarization), (*Benzenes, Polarization), (*Fluorine compounds, Polarization), Halogenated hydrocarbons, Solutions, Nuclear spins, Paramagnetic resonance, Nuclear magnetic resonance.

Identifiers: Hexafluoro benzenes.

Results are reported of a study of factors governing the dynamic polarization of fluorine nuclei in solutions of hexafluorobenzene and free radicals.

AD-640 743 **Field 7D, 7B**
Not available from CFSTI.
Army Electronics Command, Fort Monmouth, N. J. Inst. for Exploratory Research.
IDENTIFICATION OF CHEMICAL COMPOUNDS BY VOLTAGE FLUCTUATION IN THE DIRECT CURRENT ARC,
by James W. Mellichamp. 5 Jul 66, 5p
Availability: Published in Analytical Chemistry v38 n10 p1372-5 Aug 1966.

Descriptors: (*Chemical analysis, *Electric arcs), Voltage, Impurities, Sodium compounds, Potassium compounds, Halides, Silver compounds, Carbonates.

The effectiveness of a semiquantitative spectrochemical procedure can be extended in some cases to include recognition of simple chemical compounds, in addition to impurity analysis, by recording the voltage fluctuation of the d.c. arc during sample consumption. The recorded patterns differ sufficiently between compounds to permit identification with the use of reference patterns. A cored cathode is used to increase arc stability so that the observed fluctuations are attributable primarily to effects originating from the anode. Reference patterns were made of over 100 compounds to determine the extent and usefulness of this method. In general, compounds with boiling points between 1000C and 3500C are included. Patterns of mixtures or trace compounds are not, thus far, practical for interpretation. (Author)

AD-640 750 **Field 7D, 11F**
Not available from CFSTI.
Yale Univ., New Haven, Conn. Dept. of Engineering and Applied Science.
ANALYSIS OF THE BROADENING OF POWDER PATTERN PEAKS USING VARIANCE, INTEGRAL BREADTH, AND FOURIER COEFFICIENTS OF THE LINE PROFILE.
Technical rept.,
by N. C. Halder, and C. N. J. Wagner. Jun 66, 15p
TR-16
Contract Nonr-609 (43)
Availability: Published in Advances in X-Ray Analysis v9 p91-102 1966.

Descriptors: (*X-ray diffraction analysis, Powder metals), (*Tungsten, X-ray diffraction analysis), Fourier analysis, Integrals, Analysis of variance.

Conclusions: (1) The Fourier method of line-broadening analysis by Warren-Averbach technique can be successfully employed for small values of strains, or when the strain distribution function can be approximated to a Gaussian function. (2) The integral breadth measurements lead to results comparable with those of Fourier analysis, when a parabolic relationship is used for instrumental correction as well as for particle size and strain separation. (3) The variances are extremely sensitive to the range of integration delta s. In general the quantity delta s is difficult to measure experimentally for powder pattern peaks having long tails. But a reasonable estimation of delta s is possible if one takes care of the choice of background level and the dispersion effect. The particle sizes are greatly affected by a small error in the measurement of delta s, whereas the strain values are almost independent of this error. (Author)

AD-640 770 **Field 7D**
Not available from CFSTI.
Florida Univ., Gainesville.
DIFFUSION OF GASES IN ELECTROLYTIC SOLUTIONS.
Technical paper,
by Keith E. Gubbins, Kamlesh K. Bhatia, and Robert D. Walker Jr. 10 Jan 66, 6p TP-359
Revision of manuscript submitted 23 Jul 65.
Availability: Published in A.I.Ch.E. Journal v12 n3 p548-52 May 1966.

Descriptors: (*Electrolytes, Gases), (*Diffusion, *Gases), Hydrogen, Methane, Potassium compounds, Magnesium compounds, Chlorides, Sulfates.

Measurements of the diffusion coefficients of hydrogen and methane in strong aqueous electrolytes have been made with the use of the diaphragm cell method. The variation of the diffusion coefficients with electrolyte concentration, type of ion, and temperature has been studied over the electrolyte concentration range zero to saturated, and for temperatures in the range 25 to 65C. The results have been interpreted with the Eyring rate theory. The presence of ions in water increases the activation energy for diffusion which results in a decrease in the diffusion coefficient. The increase in activation energy is represented by terms that are additive for the ions involved. The influence of ions on the diffusion coefficient increases rapidly with ionic charge, but seems to be little affected by temperature or solute for the systems studied. (Author)

AD-640 777 **Field 7D, 7B**
Not available from CFSTI.
Walter Reed Army Medical Center, Washington, D. C.
SIMPLE EXPERIMENTS IN AMPEROMETRY. DETERMINATION OF ACIDS, OXIDIZING AGENTS,
by Fredric J. Feldman. 1966, 2p
Availability: Published in Journal of Chemical Education v43 p378 Jul 1966.

Descriptors: (*Electrochemistry, Chemical analysis), (*Acids, Chemical analysis), (*Oxidizers, Chemical analysis), Concentration (Chemistry), Electrolytic cells, Microanalysis, Bases (Chemistry).

Identifiers: Amperometry.

An experiment is described for the determination of acids or oxidizing agents by amperometry. The only equipment necessary is a galvanometer or microammeter, variable resistor, and flashlight cell. Less than 0.10 microequivalents of either acids or bases can be determined to better than one percent. Bases and reducing substances can be determined in a similar manner. (Author)

AD-640 785 **Field 7D**
Not available from CFSTI.
Oklahoma Univ., Norman.
DISSOCIATION OF MOLECULAR HYDROGEN BY ELECTRON IMPACT,
by S. J. B. Corrigan. 23 Jul 65, 8p
Contract AF 49 (638)-1404
Proj. AF-9767
Task 976701
AFOSR-66-1446

Availability: Published in Journal of Chemical Physics v43 n12 p4381-6 Dec 15 1965.

Descriptors: (*Hydrogen, Dissociation), (*Electron bombardment, Hydrogen), Molecular energy levels, Excitation, Reaction kinetics, Gas ionization, Probability, Diatomic molecules, Energy.

The dissociation of molecular hydrogen by electron impact was studied by observing the rate of pressure decrease in a closed system when the dissociation fragments were trapped on molybdenum trioxide. An onset potential of 8.8 (plus or minus 0.2) eV was obtained, indicating that a large part of the dissociation must proceed through direct excitation of the repulsive b triplet-Sigma-U (+) state of the molecule. From the onset potential to 95eV, the upper energy limit of our observations, the dissociation rate increased rapidly at first, then more slowly above 14eV passing through a flat maximum at 40eV and then slowly decreasing up to the highest energy investigated. Reasons are given for supposing that the observed cleanup of hydrogen at high electron energies contains an effect due to dissociative neutralization of molecular ions. With this assumption the cross section for excitation of the molecule to triplet states is derived by subtracting the molecular ionization cross section from the observed total dissociation cross section. In this way we obtain a cross section for dissociation into neutral atoms which has a maximum of 9X10 to the -17th power sq. cm at an energy of 16.5,eV, followed by a rapid decrease with increasing electron energy. (Author)

AD-640 805 **Field 7D, 20L**
Not available from CFSTI.
Owens-Illinois Technical Center, Toledo, Ohio.
X-RAY ABSORPTION SPECTROSCOPY.
Interim rept.,
by Charles G. Dodd. 1966, 6p
Contract AF 49 (638)-1670
Proj. AF-9710
Task 971003
AFOSR-66-1787
Availability: Published in Industrial Research Aug 1966.

Descriptors: (*X-ray spectroscopy, *X-ray absorption analysis), Absorption spectrum, Spectrum signatures, Emissivity, Electron transitions.

Many of the problems that arise in materials research and related fields concern properties that are dependent on parameters such as the types of chemical bonding, coordination number, and state of oxidation in the material, as well as the general electronic structure of the constituent atoms. X-ray spectroscopy is particularly useful in solid-state chemistry problems and it may be applied alike to metals, insulators, and semiconducting materials. It is sensitive to changes in chemical bonding and it may be used to complement diffraction methods to clarify structural problems in amorphous and glassy materials, for example, with respect to nearest neighbor interatomic distances. X-ray emission spectra give more or less direct information concerning electronic transitions from filled orbitals to a short-lived inner (e.g., K or L shell) vacancy. Interpretation is complicated by the many-electron nature of the transitions, by the short times involved, by radiationless transitions, aed by more or less poorly understood instrumental resolving power and corrections required to convert spectra to density-of-states curves. X-ray absorption spectra relate to transitions of ejected electrons to higher-energy unoccupied orbitals and to scattering by structural periodicities, the former revealed best by well resolved spectra measured adjacent to an absorption edge, and the latter by extended fine structure spectra. Spectral additivity in binary alloys has been shown by the former, while additivity in ligands and oxides of transition metals by the latter. Representative spectral regions are described and experimental problems are discussed. (Author)

AD-640 845 **Field 7D**
Not available from CFSTI.
University of Southern California, Los Angeles. Dept. of Materials Science.
SEARCH FOR A DEFECT MODEL FOR UO2.
Interim rept.,
by F. A. Kroger. 24 Jan 66, 23p
Grant AF-AFOSR-986-66
Proj. AF-9710
Task 971003
AFOSR-66-1786
Availability: Published in Zeitschrift fur Physikalische Chemie Neue Folge v49 n3/5 p178-97 1966.

Descriptors: (*Uranium compounds, Oxides), (*Crystal lattice defects, Mathematical models), Experimental data, Electrical conductance, Oxygen, Band theory of solids, Atomic energy levels.

Identifiers: Uranium oxide.

Experimental data for the deviation from stoichiometry of UO2 as f (p0 sub 2,T) as available in the literature are presented and are discussed in terms of imperfection models in which ionized as well as non-ionized defects play a part. (Author)

AD-640 903 **Field 7D, 7C**
Not available from CFSTI.
Alberta Univ., Edmonton. Dept. of Chemistry.
FLUORINE-19 NUCLEAR MAGNETIC RESONANCE STUDIES OF Pi INTERACTIONS IN PENTAFLUORO PHENYLPHOSPHINES AND THEIR COMPLEXES. A CORRELATION OF COUPLING CONSTANTS WITH CHEMICAL SHIFTS,
by M. G. Hogben, R. S. Gay, and W. A. G. Graham. 21 May 66, 3p
Grant DRB-9530-49
Availability: Published in Journal of the American Chemical Society v88 n14 p3457-9 20 Jul 1966.

Descriptors: (*Complex compounds, Molecular orbitals), (*Fluorine compounds, *Molecular orbitals), (*Phosphines, Molecular association), Nuclear magnetic resonance, Molybdenum compounds, Metal carbonyls, Electrons, Canada.

Identifiers: Pentafluoro phenylphosphines.

Fluorine-19 NMR data for various pentafluoro phenylphosphines suggest that the relation of the coupling between the ortho- and para-fluorines to the chemical shift of the para-fluorine distinguishes between pi-electron donation to the phenyl ring and pi-electron withdrawal from the ring by a substituant group.

AD-640 928 **Field 7D**
CFSTI Prices: HC$1.10 MF$0.50
London Univ. (England). Computer Unit.
RESEARCH ON PROPERTIES OF NEARLY SPHERICAL MOLECULES.
Final rept.,
by R. A. Buckingham. 31 Aug 61, 6p
Contract AF 61 (052)-151

Descriptors: (*Molecular properties, Numerical analysis), Spheres, Molecular orbitals, Halogenated hydrocarbons, Gases, Transport properties, Kinetic theory, Integrals, Quantum mechanics, Hydrogen, Helium, Great Britain.

Identifiers: Carbon tetrafluoride, Particle interactions.

A summary is given of the findings of studies in the following areas: molecular orbital calculations (reported in detail in AD-640 388 and AD-640 389) calculations of transport properties of gases: short-range molecular interactions.

AD-640 966 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ., Research Foundation, Columbus.
THE LOW FREQUENCY REGION OF THE INFRARED SPECTRUM OF MATRIX ISOLATED VAPORS FROM Li20 (S)+.
Technical rept.,
by K. S. Seshadri, David White, and D. E. Mann.
Sep 66, 15p TR-5A
Contract Nonr-495 (12)
Projs. NR-357-385, RF-691
Prepared in cooperation with Ohio State Univ., Cryogenic Lab., and Advanced Research Projects Agency, Washington, D. C.

Descriptors: (*Band spectrum, Lithium compounds), (*Lithium compounds, Oxides), Spectra (Infrared), Vapors.

Identifiers: Lithium oxide.

The infrared spectrum of matrix isolated vapors from solid Li20 has been investigated on the region 60 - 350/cm. At 1640K, where the polyatomic species Li20 (g) predominates, a single feature is found at 118/cm for Li2 (7)0 (g) and 112/cm for Li2 (6)0 (g). This is assigned to the bending mode nu sub 2. At higher temperatures, 1740K, where the concentration of Li202 (g) becomes significant, two additional bands are found. On the basis of Li (6)-Li (7) isotopic shifts and relative intensities, it is possible to identify the bands in the region 240-260/cm with the B sub lu out of plane mode of Li202 (g) and those at 231-243/cm to nu sub 2 of a new molecular species Li02 (g). A force constant analysis is given. On the basis of the present work it has been concluded that Li20 is most probably linear and Li02 symmetric and nearly linear. (Author)

AD-641 102 **Field 7D, 7C**
Not available from CFSTI.
Washington Univ., Saint Louis, Mo.
SIGN OF THE 13C ISOTROPIC HYPERFINE COUPLING CONSTANT IN 13C-LABELLED (C6H5)3C.,
by H. van Willigen, and S. I. Weissman. 2 Sep 65, 3p
Grants AF-AFOSR-771-65, NSF-GP-2676
Proj. AF-9767
Task 976701
AFOSR-66-1570
Availability: Published in Journal of Chemical Physics v44 n1 p420 Jan 1 1966.

Descriptors: (*Polycyclic compounds, Hyperfine structure), Labeled substances, Carbon, Electron spin resonance, Stable isotopes.

Identifiers: Triphenyl methanes.

ESR spectra of triphenylmethane radical in carbon disulfide solution at -50C verified that the isotropic hyperfine coupling constant is positive. This resolution of the controversy on the sign of the coupling constant was obtained by using isotropic carbon-13 in the central position of the molecule. (Author)

AD-641 154 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Goettingen Univ. (West Germany). Institut Fuer Physikalische Chemie.
INVESTIGATIONS OF THE IMINO RADICALS IN THE SHOCK TUBE PYROLYSIS OF N2H4, NH3, ND3 AND SHOCK TUBE STUDIES ON N20 AND NH3 AT HIGH PRESSURES,
by K. W. Michel, and H. Gg. Wagner. 31 Oct 64, 6p Scientific-1
Grant AF-EOAR-67-64

Descriptors: (*Nitrogen compounds, *Shock tubes), (*Hydrazine, Pyrolysis), (*Ammonia, Pyrolysis), Oxides, Decomposition, Reaction kinetics, Ultraviolet spectroscopy, Instrumentation, Deuterated compounds, Imines, Highpressure research, West Germany.

Identifiers: Nitrogen oxides.

An optical arrangement was set up which allows simultaneous recording of the decompositions of

various species of the nitrogen-hydrogen system on the basis of light absorption in the ultraviolet. Parent molecules investigated in this way were N2H4 and ND3. Even during fast decompositions of N2H4 the amounts of NH are appreciably less than those appearing during NH3 pyrolysis. Comparing NH or ND absorption traces during the decompositions of NH3 and ND3, resp. indicates similar decomposition mechanisms even though the rate constants of the parent molecules show appreciable differences. In addition, the approach of the high-pressure limit in the unimolecular decomposition of NH3 and N2O was investigated bymeans of the high-pressure shock tube described previously. (Author)

AD-641 167 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
ON THE HYPERFINE INTERACTION AND ZEEMAN EFFECT IN ATOMIC HYDROGEN 1S (1/2) AND 2P (1/2) STATE,
by Jack Finkel. 18 Jul 66, 16p NOLTR-66-47
Proj. MAT-03L-00/R000-01-01

Descriptors: (*Hydrogen, *Atomic energy levels), Line spectrum, Hyperfine structure, Electromagnetic waves, Magnetic fields, Matrix algebra.

Identifiers: Zeeman effect.

The eigenvalues and eigenfunctions of atomic hydrogen in the 1S (1/2) and 2P (1/2) states in the presence of a d.c. magnetic field taking account of the hyperfine interactions are calculated using matrix methods. (Author)

AD-641 207 **Field 7D, 20J**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
ELECTRONS IN LIQUIDS,
by Joshua Jortner, Stuart A. Rice, and Neil R. Kestner. 19 Jul 66, 34p
Grant AF-AFOSR-781-65
Proj. AF-9760
Task 976001
AFOSR-66-1450
Availability: Published in Modern Quantum Chemistry pt2 p133-64 1965.

Descriptors: (*Electrons, *Liquids), (*Solutions, Electrons), Quantum mechanics, Solvents, Elementary particles, Models (Simulations), Dielectric properties, Electric moments, Thermochemistry, Metals, Ammonia, Reviews.

Identifiers: Metal-ammonia solutions, Polarons.

Some current theoretical studies of electron-solvent interactions in polar and nonpolar solvents are discussed. Topics include: comments on the polaron model; continuum dielectric models; dielectric models for electrons in polar solvents; thermochemical data concerning charge distribution in metal-ammonia solutions; excitation states of electrons in polar solvents; application of theories of metals to concentrated metal-ammonia solutions; the free electron model; the bubble model.

AD-641 208 **Field 7D, 20F**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
REFLECTION SPECTRA OF LIQUID Hg, In, AND Bi FROM 2-20eV.
Revised ed.,
by E. G. Wilson, and Stuart A. Rice. 14 Jan 66, 12p
Grant AF-AFOSR-781-65
Proj. AF-9760
Task 976001
AFOSR-66-1407
Revision of manuscript submitted 29 Jul 65.
Availability: Published in The Physical Review v145 n1 p55-63 May 6 1966.

Descriptors: (*Liquid metals, *Ultraviolet spectroscopy), (*Mercury, Spectra (Visible + ultraviolet)), (*Indium, Spectra (Visible + ultraviolet)), (*Bismuth, Spectra (Visible + ultraviolet)), Reflection, Electrons, Dielectric properties, Absorption spectrum, Band theory of solids.

The reflection spectra of liquids Hg, In, and Bi were measured from 2 to 20 eV and the real and imaginary parts of the dielectric constant of Hg. For the case of liquid Hg it is found that: (a) the imaginary part of the dielectric constant has a Drude-like contribution and three absorption peaks in the range 2-20 eV; (b) to account for the imaginary part of the dielectric constant in the energy range below 7 eV it is necessary to extend the Drude theory to include more realistically the effects of electron-ion interaction; (c) both the shape and positions of two absorptions, centered at 8.3 and 10.0 eV are consistent with the interpretation that the 5d levels of Hg are not appreciably broadened in the liquid; (d) there is a broad absorption centered at about 6.5 eV which at present cannot be unambiguously assigned; (e) the data support the conclusion that liquid Hg may be described with the free-electron approximation over a wide range of energies and that the only interband excitation which occur are from the core states to the conduction state. For the case of liquid In and Bi it appears that: (a) liquid In and Bi depart markedly from the free-electron model; (b) the reflectivity of In shows a peak centered at approx. 20 eV which, by analogy with the interpretation given of the spectrum of liquid Hg which may be an excitation of a 4d core electron; (c) there appear to be no interband transitions of conduction electrons to higher bands, such as occur in the solid on account of the zone structure.

AD-641 209 **Field 7D, 20L, 20J**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
EXCITONS AND ENERGY TRANSFER IN MOLECULAR CRYSTALS,
by Joshua Jortner, Stuart A. Rice, and Robert Silbey. 21 Jul 66, 24p
Grant AF-AFOSR-781-65
Proj. AF-9760
Task 976001
AFOSR-66-1506
Availability: Published in Modern Quantum Chemistry pt3 p139-60 1965.

Descriptors: (*Aromatic compounds, Crystals), (*Electron transitions, Aromatic compounds), (*Molecular energy levels, Excitation), Quantum mechanics, Continuous spectrum, Theory, Crystal structure, Band theory of solids, Wave functions, Band spectrum, Electrons.

Identifiers: Excitons.

A critical discussion is presented of some properties of exciton states in molecular crystals of aromatic molecules. Emphasis is given to the problems related to the theoretical interpretation of singlet exciton states. Triplet and charge transfer exciton states are briefly considered.

AD-641 210 **Field 7D, 20L, 20J**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
COOPERATIVE EXCITON STATES IN MOLECULAR CRYSTALS,
by Joshua Jortner, and Stuart A. Rice. 28 Dec 65, 14p
Grant AF-AFOSR-781-65
Proj. AF-9760
Task 976001
AFOSR-66-1865
Availability: Published in Journal of Chemical Physics v44 n9 p3364-74 May 1 1966.

Descriptors: (*Molecular energy levels, Excitation), (*Electron transitions, Crystals), Electrons, Probability, Perturbation theory, Molecular association, Selection rules, Spectra (Infrared).

Identifiers: Excitons.

The transition probability is calculated for excitation of double-exciton states in absorption and emission processes in molecular crystals. It is found that: (1) A major contribution to the transition probability for cooperative excitation to electronic states arises from intermolecular Coulomb interactions, while the contribution of intermolecular electron-exchange interactions is relatively small. (2) Contributions to the transition probability from high-order-transition multipole interactions are of considerable importance. (3) Approximate selection rules for cooperative electronic excitation imply that for one component the initial and final states are of the same parity, while for the second component the transition is symmetry allowed. (4) Theoretical evidence is obtained for the appearance of double-excitation bands in the infrared spectra of solids in the overtone region. (5) A major contribution to the intensity of the double-vibrational-exciton states arises from an intermolecular Fermi resonance effect. (6) The direct detection of the radiative annihilation of a double-exciton state is not likely to be experimentally feasible. (Author)

AD-641 211 **Field 7D, 20J**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
THE ELECTRON-HELIUM ATOM PSEUDOPOTENTIAL,
by Joshua Jortner, Neil R. Kestner, Stuart A. Rice, and Morrel H. Cohen. 1964, 4p
Grant AF-AFOSR-781-65
AFOSR-66-1408
Availability: Published in Modern Quantum Chemistry pt2 p129-32 1965.

Descriptors: (*Helium, *Atomic orbitals), (*Electrons, Scattering), Potential theory, Wave functions, Polarization, Nuclear cross sections.

Calculation was made of the helium atom pseudopotential, based on data obtained by scattering very low energy electrons from He atoms.

AD-641 212 **Field 7D, 20J, 7B**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
CHEMICAL PREDICTIONS BY MO THEORY: THE RARE GAS HALIDES,
by Joshua Jortner, and Stuart A. Rice. 20 Jul 66, 35p
Grant AF-AFOSR-781-65
Proj. AF-9760
Task 976001
AFOSR-66-1458
Availability: Published in Modern Quantum Chemistry Pt1 p15-47 1965.

Descriptors: (*Helium group gases, Chemical compounds), (*Molecular orbitals, *Fluorides), (*Xenon, Molecular orbitals), Halides, Theory, Wave functions, Valence, Chemical bonds, Physical properties, Molecular energy levels, Excitation, Electron transitions, Selection rules.

Identifiers: Helium group compounds, Xenon difluoride, Xenon hexafluoride, Xenon tetrafluoride.

A semi-empirical analysis is made of the molecular structure of the xenon fluorides. Topics include: the electron-correlation method; the molecular orbital model; the valence bond model; interpretation of physical properties in terms of the models (molecular geometry, ESR, NMR, magnetic susceptibility, Mossbauer effect, heats of sublimation); excited electron states (allowed and forbidden transitions, Rydberg states).

AD-641 230 Field 7D, 20D
Not available from CFSTI.
Chicago Univ., Ill.
RADII OF POSITIVE AND NEGATIVE IONS IN HELIUM II.
by Peter E. Parks, and R. J. Donnelly. 6 Dec 65, 7p
Grant AF-AFOSR-785-65
Proj. AF-9767
Task 976701
AFOSR-66-1270
Availability: Published in Physical Review Letters v16 n2 p45-8 Jan 10 1966.

Descriptors: (*Liquefied gases, Helium), (*Helium, Ions), Cryogenics, Superfluidity, Vortices, Brownian motion, Wave functions.

The radii of positive and negative ions in Helium II are estimated from their measured mean lifetimes in traps found by quantized vortex lines. The radii are 6.44 plus or minus 0.10 Angstroms for the positive ion and 14.5 plus or minus 0.4 Angstroms for the negative ion. (Author)

AD-641 268 Field 7D, 20A
Not available from CFSTI.
Vermont Univ., Burlington. Dept. of Physics.
CHANGES IN AN ELECTRODE PROCESS BROUGHT ABOUT BY SMALL-SCALE ACOUSTIC STREAMING,
by W. E. Rowe, and Wesley L. Nyborg. 1966, 10p
Grant AF-AFOSR-62-63
Proj. AF-9767
Task 976702
AFOSR-66-1869
Availability: Published in Journal of the Acoustical Society of America v39 n5 pt1 p965-71 May 1966.

Descriptors: (*Electrolysis, *Acoustics), Polarization, Ultrasonic radiation, Mass transfer, Motion, Electrodes, Platinum.

Identifiers: Sonochemistry, Acoustic streaming.

Ultrasound in the absence of cavitation was applied in a special manner to a process in which the sonic effect on surface layers and mass transport of reactants could be studied. The process selected involved cyclic anodic and cathodic polarization of a platinum electrode in dilute acid. The test electrode was a small platinum sphere mounted on the tip of an 85-kc/sec Mason horn. Sound applied during selected parts of the cycle caused pronounced changes in recordings of the electrode potential versus time. These changes probably result from the transport of dissolved gases, via small-scale acoustic streaming, to and from the electrode surface. An order-of-magnitude approach is given to the theory for mass transport associated with the acoustic streaming. (Author)

AD-641 293 Field 7D, 20L
Not available from CFSTI.
Pittsburgh Univ., Pa. Dept. of Physics.
NUCLEAR MAGNETIC RESONANCE STUDY OF MOLECULAR MOTIONS IN SOLID HYDROGEN SULFIDE,
by D. C. Look, I. J. Lowe, and J. A. Northby. 21 Dec 65, 13p
Grant AF-AFOSR-196-63
Proj. AF-9763
Task 976303
AFOSR-66-1746
Availability: Published in The Journal of Chemical Physics v44 n9 p3441-52 May 1 1966.

Descriptors: (*Sulfides, Nuclear magnetic resonance), (*Hydrogen compounds, Nuclear magnetic resonance), Molecular properties, Motion, Protons, Relaxation time.

Identifiers: Hydrogen sulfide.

Pulsed nuclear magnetic resonance experiments on protons in solid hydrogen sulfide were carried out at 10 Mc/sec over the temperature range of 4.2 to 175K. Proton spin-lattice relaxation times T sub 1 and T (sub 1)r along the static and rotating magnetic fields, respectively, and free-induction-decay shapes were measured. The T (sub 1)r-vs-reciprocal-temperature curves exhibit several minima which, together with the slopes, allow the determination of the correlation times of the molecular motions as a function of temperature. From the free-induction-decay shapes were derived the intermolecular and intramolecular contributions to the second moment of the proton-resonance line shape. The temperature dependence of the second moment gives information about the molecular motions and the structure of solid hydrogen sulfide. Models of the structure and motion are proposed and examined. (Author)

AD-641 296 Field 7D, 3B
Not available from CFSTI.
California Univ., Berkeley. Dept. of Astronomy.
PRESSURE DISSOCIATION AND MOLECULAR HYDROGEN.
Revised ed.
by M. S. Vardya. 24 Sep 64, 8p
Grant AF-AFOSR-171-63
Proj. AF-9774
Task 977401
AFOSR-66-1593
Revision of manuscript submitted 12 Jun 64.
Availability: Published in Monthly Notices of the Royal Astronomical Society v129 n5 p345-50 1965.

Descriptors: (*Hydrogen, *Dissociation), Pressure, Molecular energy levels, Astrophysics, Temperature, Chemical equilibrium, Ground state.

The partition functions for molecular hydrogen, with an estimate of pressure dependence included, were calculated, using extension of Heitler-London theory to theory to three electron system. These partition functions were used to evaluate the equilibrium constants and internal energies for H2 as a function of temperature and pressure. Tables of partition functions, equilibrium constants and internal energies have been given for T=1000 to 15 000K and for pressures as high as 7.7x 10 to the 9th power dyn/sq.cm. (Author)

NBS-TN-246 Field 7D, 20M
CFSTI Prices: HC$0.40 MF$0.50
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
A SURVEY OF SOME EMPIRICAL AND SEMI-EMPIRICAL INTERATOMIC AND INTERMOLECULAR POTENTIALS.
Technical note.
by Benjamin M. Axilrod. 3 Oct 66, 57p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402 $0.55.

Descriptors: (*Atoms, *Transport properties), (*Molecular association, *Potential energy), Functions, Atomic energy levels, Compressive properties, Heat of sublimation, Equations of state.

Identifiers: Potential functions.

Many empirical and semi-empirical potential functions have been proposed or developed to represent the pairwise interaction of atoms and molecules. The simple pair potentials proposed usually contain parameters to be adjusted to fit certain properties, for example, when chemical combination does not occur, virial coefficients and similar quantities for the gaseous state, or compressibility and heat of sublimation for the crystalline state. A number of potentials proposed recently are examined to indicate the variety of concepts employed and the suitability of the potential functions. (Author)

NBS-TN-400 Field 7D, 7B
CFSTI Prices: HC$0.55 MF$0.75
National Bureau of Standards, Washington, D. C.
ELECTROCHEMICAL ANALYSIS: STUDIES OF ACIDS, BASES, AND SALTS BY EMF, CONDUCTANCE, OPTICAL, AND KINETIC METHODS. JULY 1965 TO JUNE 1966,
6 Sep 66, 109p
See also C13.46-271.

Descriptors: (*Electrochemistry, Chemical analysis), (*Chemical - analysis, Reviews), Acids, Bases (Chemistry), Salts, pH, Potassium compounds, Phthalates, Buffers, Pyridines, Heavy water, Acid-base reactions, Dissociation, Acetic acids, Organic solvents, Chemical equilibrium, Thermodynamics, Water, Microanalysis, Reaction kinetics, Spectroscopy, Electrical conductance, Standards.

The report comprises the second annual progress report of the Electrochemical Analysis Section of the NBS Analytical Chemistry Division. Contents include: Facilities and equipment; Measurement of acidity (pH standards, Standard pH values for 4-aminopyridine buffers in 50 percent methanol, Standards for a pD scale in deuterium oxide, A scale of acid strengths in benzene); Solvent effects on acid-base processes (Dissociation of positively-charged acids in methanol-water solvents, Isotope effects on the dissociation of acetic acid in water and deuterium oxide, Acid-base behavior in organic solvents with low dielectric constants, Spectrophotometric studies of the dissociation of phenols); Equilibrium studies of systems of analytical interest (Thermodynamics of the dissociation of morpholinium ion in water, Ionization constant of deuterium oxide from 5 to 50C, Response of the glass electrode in heavy water); Thermodynamic studies of aqueous solutions of mixed salts; Conductometric determination of traces of water; Kinetic techniques in trace analysis; Standard reference materials for acidimetry (Homogeneity tests of potassium hydrogen phthalate 84h, Certification of potassium hydrogen phthalate 84h as an acidimetric standard, Status of certification procedures for standard reference materials).

NBS-TN-401 Field 7D
CFSTI Prices: HC$0.55 MF$0.75
National Bureau of Standards, Washington, D. C. Inst. for Materials Research.
ACTIVITIES OF THE NBS SPECTROCHEMICAL ANALYSIS SECTION.
Technical note, Jul 65-Jun 66,
by Bourdon F. Scribner. 30 Sep 66, 110p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402 $0.55.

Descriptors: (*Spectroscopy, Reviews), (*Chemical analysis, Reviews), Instrumentation, Computers, Lasers, Plasma jets, Atomic spectroscopy, X-ray spectroscopy, Fluorescence, Electron beams, Microanalysis, Mass spectroscopy, Electrodeposition, Purification, Standards, Analog computers, Programming (Computers).

Identifiers: Time sharing (Computers).

Activities in optical spectrometry included development of programs for calculations on a time-sharing computer, measurement of arc temperatures, applications of the laser probe and the plasma jet, and studies on atomic absorption spectrometry. In x-ray spectroscopy, there were some modifications of equipment, improvements in computation methods, and several applications. Improvements and additions were made to the electron probe analyzer, along with studies on measurement techniques, including nondispersive analysis and computation procedures. The spark-source mass spectrometer was also modified, and a new analog computer has been built and tested for reduction of photographic plate data; applications of this instrument to analyses of pure materials are described. Enrichment methods are being studied for the analysis of pure materials by emission spectroscopy, particularly with an electrodeposition technique. Homogeneity studies and

analyses were performed in the development of standard reference materials. (Author)

NBS-TN-403 **Field 7D, 14B**
CFSTI Prices: HC$0.50 MF$0.75
National Bureau of Standards, Washington, D. C. Inst. for Materials Research.
MICROCHEMICAL ANALYSIS SECTION: SUMMARY OF ACTIVITIES JULY 1965 to JUNE 1966.
Technical note,
by John K. Taylor. 1 Sep 66, 91p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402 $0.50

Descriptors: (*Microanalysis, Reviews), (*Mass spectroscopy, Reviews), (*Polarographic analysis, Reviews), (*Electrochemistry, Reviews), Gases, Standards, Metals, Chemical analysis, Volumetric analysis, Uranium compounds, Oxides, Iodine, Magnesium, Lead, Chromatographic analysis, Aluminum compounds, Coolants, Beryllium compounds, Carbides, Photographic chemicals, Laboratories, Laboratory equipment.

Identifiers: Coulometric titration, Stoichiometry.

Partial contents: Mass spectrometric gas analysis (High pressure mass spectrometry, Standard reference materials, Sample pretreatment prior to mass spectrometric analysis, General applications); Polarographic analysis (High precision polarography, High sensitivity polarography, Ultrasmall sample analysis, Standard reference materials, Research materials, Identification of metals); Coulometric analysis (Coulometric iodimetry, High precision controlled potential coulometry, Analysis of uranium oxide, Iodide content of Tracer solutions, General applications); Stoichiometry (Magnesium, Lead); Classical microchemical analysis (Elemental analysis of small samples, Reversed-phase chromatography, Alumina boules, Linac cooling water system, Beryllium carbide, Iodide in photographic fixing baths, Standard reference materials, Miscellaneous analyses).

NLCO-980 **Field 7D, 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
National Lead Co. of Ohio, Cincinnati.
SUMMARY TECHNICAL REPORT FOR THE PERIOD APRIL 1, 1966 TO JUNE 30, 1966,
by R. Burgett. Jul 66, 29p
Contract AT (30-1)-1156

Descriptors: (*Nuclear physics, Reports), (*Nuclear engineering, Scientific research).

For abstract, see NSA 20 21.

N66-30083 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
A METHOD FOR THE NONDISPERSIVE ANALYSIS OF VERY LIGHT ELEMENTS.
Une Methode D'analyse Non Dispersive Des Elements Tres Legers
by R. Castaing, and F. Pichoir. Jul 66, 36p
NASA-TT-F-422
Transl. Into English From Le Rech. Aerospatiale (Seine), No. 108, 1965 P 3-16

Descriptors: *Band pass filter, *Light element, *Spectrography, *X-ray spectroscopy, Acceleration, Band, Electron, Element, Emission, Filter, Light, Low, Noise, Pass, Ratio, Signal, Signal-to-noise, Spectroscopy, Voltage, X-ray.

For abstract, see STAR 04 17.

N66-30162 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Materials Research Lab.
RESEARCH ON THE MECHANISM AND KINETICS OF OXIDATION OF SILICON IN AIR SECOND SEMIANNUAL REPORT, 1 DEC. 1965 - 31 MAY 1966.
by V. Prosser, R. Rai, and K. Vedam. 20 Jun 66, 28p NASA-CR-76098
Contract NGR-39-009-042

Descriptors: *Oxide film, *Silicon, *Thin film, Air, Calibration, Chemical, Crystal, Crystal growth, Ellipsometer, Film, Growth, Kinetics, Liquid, Mechanism, Oxide, Reaction, Thin, Ultrahigh vacuum.

For abstract, see STAR 04 17.

N66-30426 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Stuttgart (West Germany). Institut Fuer Spektroskopie Und
AN EXTENSION OF THE SWAN SYSTEM AND THE ANALYSIS OF THE HIGH PRESSURE BANDS OF THE C2 MOLECULE.
Eine Erweiterung Des Swan-systems Und Die Analyse Der Hochdruck-banden Des C2-molekuels
by G. Messerle. May 66, 36p DVL-509, DLR-FB-66-31
In German, English Summary

Descriptors: *Carbon, *Diatomic molecule, *Spectral analysis, *Swan band, Analysis, Band, Diatomic, Electron, Energy, Extension, High pressure, Level, Molecule, Radiation, Spectral, System, Visible.

For abstract, see STAR 04 17.

N66-31201 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Portugal. Nuclear Energy Commission, Sacavem. Lab. For Nuclear Physics And Engineering.
REDUCTION OF CERIC SULFATE IN THE PRESENCE OF THALLOUS IONS. INTRATRAJECTORY DISTRIBUTION OF THE PRIMARY PRODUCTS OF RADIOLYSIS.
Reducao Do Sulfato Cerico Em Presenca De Ioes Talosos. Reparticao Intratrajectoria Dos Produtos Primarios De Radiolise
by M. H. Mariano, and H. M. Novais. 1966, 28p LFEN-49 (ALPHA)
In Portuguese

Descriptors: *Alpha particle, *Cerium, *Radiolysis, *Reduction, Alpha, Capture, Concentration, Curve, Diffusion, Distribution, Electron, Function, Group, Hydroxyl, Ion, Negative, Oxidation, Particle, Path, Primary, Product, Radiation, Radical, Sulfate, Thallium, Trajectory, Yield.

For abstract, see STAR 04 17.

N66-31371 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Physics Dept.
VIBRATIONAL RELAXATION MEASUREMENTS IN CO2 USING AN INDUCED FLUORESCENCE TECHNIQUE.
by G. W. Flynn, L. O. Hocker, A. Javan, M. A. Kovacs, and C. K. Rhodes. 1966, 16p NASA-CR-76392
Grant NSG-330

Descriptors: *Carbon dioxide, *Fluorescence, *Vibrational relaxation, Carbon, Collision, Coupling, Dc, Dioxide, Discharge, Infrared, Laser, Measurement, Mode, Output, Q-switch, Relaxation, Stretching, Vibration.

For abstract, see STAR 04 17.

N66-31703 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Florida Univ., Gainesville. Quantum Theory Project.
THEORY OF INTERNAL RELAXATION IN CHEMICAL KINETICS.
by G. L. Hofacker. 15 Jan 66, 50p NASA-CR-76432
Grant NSG-512
Its Preprint No. 66

Descriptors: *Chemical kinetics, *Isomerization, *Vibrational relaxation, Chemical, Derivation, Equation, Internal, Intramolecular, Kinetics, Master, Reaction, Rearrangement, Relaxation, Solution, Theory, Vibration.

For abstract, see STAR 04 17.

N66-31945 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Atomic Energy Of Canada, Ltd., Chalk River (Ontario).
ON THE EFFECT OF TI O2 ADDITIONS ON DEFECT STRUCTURE, SINTERING AND GAS RELEASE OF UO2.
by HJ. Matzke. May 66, 39p AECL-2585

Descriptors: *Sintering, *Titanium oxide, *Uranium oxide, Addition, Bombardment, Defect, Dioxide, Gas, Ion, Model, Oxide, Release, Structure, Titanium, Uranium.

For abstract, see STAR 04 17.

N66-32305 **Field 7D**
CFSTI Prices HC$2.50 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Research Labs.
SILICON OXIDE FILMS GROWN AND DEPOSITED IN A MICROWAVE DISCHARGE.
by R. M. Handy, and J. Kraitchman. 1966, 65p NASA-CR-76658
Contract NAS8-11931

Descriptors: *Microwave apparatus, *Silicon oxide, *Thin film, Apparatus, Deposition, Device, Discharge, Effect, Fabrication, Field, Film, Growth, Microwave, Oxide, Silicon, Thin, Transistor.

For abstract, see STAR 04 17.

N66-32315 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Grumman Aircraft Engineering Corp., Bethpage, N. Y.
CALCULATIONS OF THE INTERACTIONS OF DIATOMIC MOLECULES WITH SOLID SURFACES.
by R. A. Oman. Jun 66, 26p NASA-CR-76724, RE-260J
Contract NASW-1195
Presented At 5th Intern. Symp. On Rarefied Gas Dyn., Oxford, 4-8 Jul. 1966

Descriptors: *Diatomic molecule, *Gas-metal interaction, *Solid surface, Calculation, Diatomic, Energy, Exchange, Excitation, Gas, Impact, Interaction, Metal, Model, Molecule, Momentum, Solid, Surface, Trajectory, Vibration.

For abstract, see STAR 04 17.

N66-32550 **Field 7D**
CFSTI Prices HC$2.50 MF$0.75
Gulton Industries, Inc., Metuchen, N. J. Alkaline Battery Div.
INVESTIGATION OF BATTERY ACTIVE NICKEL OXIDES FOURTH QUARTERLY REPORT.
by S. Lerner, P. Ritterman, and H. N. Seiger. 12 Jun 66, 65p NASA-CR-72018
Contract NAS3-7620

Descriptors: *Electrochemistry, *Nickel oxide, *Sintering, *Temperature effect, Battery, Cadmium, Capacity, Charge, Cobalt, Comparison, Data, Effect, Electrode, Iodimetry, Manganese, Nickel, Oxidation, Oxides.

Positive, Retention, Stand, State, Structure, Temperature, Titration, X-ray.

For abstract, see STAR 04 17.

N66-32643 **Field 7D**
CFSTI Prices HC$2.50 MF$0.75
Aero Vac Corp., Troy, N. Y.
EFFECT OF LOW DENSITY INERT GAS FLUSH ON OXYGEN-COLUMBIUM REACTION AT 1500 DEG F TO 2000 DEG F FINAL REPORT.
14 May 64, 83p NASA-CR-76979
Contract NASW-722

Descriptors: *Flow chamber, *Gas-metal interaction, *Low density gas, Atmospheric, Chamber, Columbium, Contaminant, Control, Equation, Flow, Furnace, Gas, Helium, Impurity, Inert, Interaction, Low density, Metal, Outgassing, Oxygen, Pressure, Surface, Vacuum, Velocity.

For abstract, see STAR 04 17.

N66-32657 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
United Kingdom Atomic Energy Authority, Harwell (England). Chemistry Div.
MASS SPECTROMETRIC MEASUREMENTS OF THE RATIO OF NEUTRON CAPTURE TO FISSION FOR 239 PU AND 241 PU AND OF THE ABSORPTION AND CAPTURE CROSS SECTIONS OF 239 PU, 240 PU AND 241 PU FOR MAXWELLIAN NEUTRONS.
by M. J. Cabell, and M. Wilkins. 13 Apr 66, 25p
AERE-R-5166

Descriptors: *Irradiation, *Mass spectrometry, *Neutron bombardment, *Plutonium, Absorption, Analysis, Bombardment, Capture, Cobalt, Fission, Isotope, Mass, Mixture, Neutron, Plutonium 239, Plutonium 241, Spectrometry.

For abstract, see STAR 04 17.

N66-37275 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
National Bureau of Standards, Washington, D. C. Inst. For Basic Standards.
ELECTROCHEMICAL DATA, PART III QUARTERLY REPORT, 1 APR. - 30 JUN. 1966.
by H. J. De wane, and W. J. Hamer. 15 Aug 66, 11p NASA-CR-78145, NBS-9394
NASA ORDER R-09-022-029

Descriptors: *Electric conductivity, *Hydrochloric acid, Acid, Concentration, Conductance, Conductivity, Electric, Electrolyte, Equivalent, Hydrochloric, Table.

For abstract, see STAR 04 22.

N66-37286 **Field 7D**
CFSTI Prices HC$3.00 MF$1.00
Whittaker Corp., San Diego, Calif. Narmco Research And Development Div.
ELECTROCHEMICAL CHARACTERIZATION OF SYSTEMS FOR SECONDARY BATTERY APPLICATION FIRST QUARTERLY REPORT, MAY - JUL. 1966.
by A. H. Remanick, and M. Shaw. 17 Aug 66, 116p
NASA-CR-72069
Contract NAS3-8509

Descriptors: *Battery, *Electrochemistry, *Electrode, *Electrolyte, *Screening technique, Chloride, Copper, Density, Fluoride, High energy, Level, Molecular, Nickel, Screening, Silver, Solvent, Technique.

For abstract, see STAR 04 22.

N66-37583 **Field 7D**
CFSTI Prices HC$4.00 MF$1.00
National Bureau of Standards, Washington, D. C.
A SURVEY OF THERMODYNAMIC PROPERTIES OF THE COMPOUNDS OF THE ELEMENTS CHNOPS EIGHTH PROGRESS REPORT, 1 APR. - 30 JUN. 1966.
by G. T. Armstrong, G. T. Furukawa, I. Halow, G. D. Mitchell, and M. L. Reilly. 15 Jul 66, 119p
NASA-CR-78337, NBS-9374
NASA ORDER R-138

Descriptors: *Physical chemistry, *Thermodynamic property, Carbon, Compound, Enthalpy, Formation, Heat, Hydrogen, Nitrogen, Oxygen, Phosphorus, Sulfur.

For abstract, see STAR 04 22.

ORNL-3963 **Field 7D, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
EXAMINATION OF HYDROUS-URANIUM DIOXIDE PRECIPITATES AND SOLS BY ELECTRON MICROSCOPY, ELECTRON DIFFRACTION, AND SPECTROPHOTOMETRY,
by C. J. Hardy. Aug 66, 22p
Contract W-7405-eng-26

Descriptors: (*Reactor fuels, Uranium compounds), (*Physical chemistry, Reactor fuels).

For abstract, see NSA 20 21.

AD-640 696 **See Field 21B**

AD-640 830 **See Field 21B**

AD-640 949 **See Field 20B**

AD-640 953 **See Field 15B**

AD-641 013 **See Field 20A**

AD-641 069 **See Field 7E**

AD-641 070 **See Field 7E**

AD-641 144 **See Field 14B**

AD-641 222 **See Field 20L**

AD-641 224 **See Field 20F**

AD-641 236 **See Field 20L**

AD-641 256 **See Field 20D**

IS-1356 **See Field 7B**

PB-173 053 **See Field 6E**

7E. RADIO AND RADIATION CHEMISTRY

AD-640 694 **Field 7E, 11G**
CFSTI Prices: HC$3.00 MF$0.75
American Cyanamid Co., Stamford, Conn. Central Research Div.
CHEMILUMINESCENT MATERIALS.
Technical rept. no. 13, 1 Jun-31 Aug 66,
by M. M. Rauhut, L. J. Bollyky, D. R. Maulding, R. A. Clarke, and B. G. Roberts. 31 Aug 66, 79p
Rept. no. 06-1432-25-Q13
Contracts Nonr-4200 (00), ARPA Order-299
Proj. NR-356-452
See also AD-635 142.

Descriptors: (*Lighting equipment, Chemiluminescence), (*Chemiluminescence, Materials), (*Oxalates, Chemiluminescence), Peroxides, Esters, Emissivity, Molecular structure, Additives, Chemical reactions, Synthesis (Chemistry), Pyridines, Aldehydes, Ketones, Amides.

Identifiers: Bis (Pyridonyl) glyoxal.

Results from a program designed to optimize the operating characteristics of peroxyoxalate chemiluminescent systems are reported. In particular, the effects of oxalate ester structure, fluorescer structure and certain reaction variables on the light capacities and emission lifetimes of such systems are described. A survey of the effects of a large number of additive components on the lifetimes and efficiencies of several oxalate ester chemiluminescent systems provided additives effective for both lifetime control and light capacity improvement. High light capacity systems are now available with lifetimes variable between one minute and 2 1/2 hours. Investigations of reaction products, reaction intermediates, oxalate ester preparation and oxalate ester stability are reported. The structure of a previously reported efficient chemiluminescent material was identified as bis (1- (1H)-2-pyridonyl) glyoxal. Efficient peroxyoxalate chemiluminescence has thus been extended from the ester to the amide series. (Author)

AD-640 948 **Field 7E, 7C**
Not available from CFSTI.
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
INTERSYSTEM CROSSING OF THE ELECTRONICALLY EXCITED DIDEUTEROETHYLENE MOLECULES FORMED IN BENZENE PHOTOSENSITIZATION,
by Terumi Terao, Shun-Ichi Hirokami, Shin Sato, and R. J. Cvetanovic. 19 Jan 66, 9p
NRC-9099
Availability: Published in Canadian Journal of Chemistry v44 p2173-80 1966.

Descriptors: (*Ethylenes, *Molecular energy levels), Deuterated compounds, Excitation, Photochemistry, Molecular isomerism, Decomposition, Canada.

Experimental evidence is presented for a rapidly occurring intersystem crossing of the electronically excited dideuteroethylene molecules initially formed in the benzene-photosensitized reaction at 2,537A and 25C to another excited state which is responsible for the internal H-atom scrambling. The mechanism is entirely analogous to that previously postulated for the photoexcited states sensitized by Hg (3P1) atoms but the rate constants for intersystem crossing and molecular decomposition are drastically decreased as a result of the smaller amount of energy available for the excitation. (Author)

AD-641 069 **Field 7E, 7D**
Not available from CFSTI.
Windsor Univ. (Ontario). Dept. of Physics.
SENSITIZED FLUORESCENCE IN VAPORS OF ALKALI METALS. VI. ENERGY TRANSFER IN COLLISIONS BETWEEN RUBIDIUM AND INERT GAS ATOMS,
by Bruce Pitre, A. G. A. Rae, and L. Krause. 19 Nov 65, 12p
Grant AF-AFOSR-361-65
Proj. AF-9767
Task 976702
AFOSR-66-1437
See also AD-629 818.
Availability: Published in Canadian Journal of Physics v44 p731-40 1966.

Descriptors: (*Alkali metals, *Fluorescence), (*Rubidium, Fluorescence), Vapors, Transport properties, Atomic energy levels, Excitation, Probability, Molecular association, Helium group gases, Electron transitions, Canada.

Identifiers: Particle interactions.

The total cross sections for inelastic collisions between rubidium and inert gas atoms, leading to a transfer of excitation between the 5-doublet-P1/2 and 5-doublet-P3/2 levels in rubidium, were determined in a study of sensitized fluorescence in rubidium- inert gas mixtures. The experiments were performed at a rubidium vapor pressure of 0.0000015mm Hg, at which there is no imprisonment of resonance radiation and over a range of inert gas pressures extending from 1 to 350 mm

Hg. The cross sections are subject to two apparent anomalies: they do not vary monotonically with the polarizabilities of the inert gases and not all of their ratios Q1/Q2 have values predicted by the principle of detailed balancing. These properties of the cross sections, as well as a partial disagreement with French's rule, are interpreted qualitatively in terms of a 'free particle' interaction between the inert gas atoms and the 5-doublet-P orbital electron in rubidium. A competing process involving three-body collisions and the possible formation of Rb-inert gas van der Waals' molecules is also suggested. (Author)

AD-641 070 **Field 7E, 7D**
Not available from CFSTI.
Windsor Univ. (Ontario). Dept. of Physics.
SENSITIZED FLUORESCENCE IN VAPORS OF ALKALI METALS. VII. ENERGY TRANSFER IN RUBIDIUM-CESIUM COLLISIONS,
by M. Czajkowski, D. A. McGillis, and L. Krause. 8 Dec 65, 13p
Grant AF-AFOSR-361-65
Proj. AF-9767
Task 976702
AFOSR-66-1436
See also AD-641 069.
Availability: Published in Canadian Journal of Physics v44 p741-51 1966.

Descriptors: (*Alkali metals, *Fluorescence), (*Rubidium, Fluorescence), (*Cesium, Fluorescence), Vapors, Transport properties, Atomic energy levels, Excitation, Probability, Ground state, Molecular association, Electron transitions, Canada.

Identifiers: Particle interactions.

Sensitized fluorescence in cesium vapor induced by collisions with excited rubidium atoms was investigated in order to determine the total cross sections for inelastic collisions between excited rubidium atoms and cesium atoms in their ground states. The partial pressure of the rubidium vapor in the Rb-Cs mixture was kept below 0.00002mm Hg in order to eliminate effects due to the trapping of the Rb resonance radiation. The fact that the cross sections were found to be considerably smaller than those for collisions between similar atoms indicates that the Rb-Cs interactions probably involve van der Waals' forces with a much shorter range than exchange forces, which play a dominant role in Rb-Rb or Cs-Cs collisions. (Author)

AD-641 151 **Field 7E, 7C**
Not available from CFSTI.
New York Univ., N. Y. Dept. of Chemistry.
PHOTOCHEMISTRY OF UNSATURATED KETONES. PART VIII. EVIDENCE FOR A 1,2-HYDROGEN-ATOM MIGRATION IN A PHOTOCHEMICALLY GENERATED DIRADICAL,
by David I. Schuster, and Ira S. Krull. 7 May 66, 3p
Grant DA-ARO (D)-31-124-G425
AROD-4019:10
See also AD-634 892.
Availability: Published in Journal of the American Chemical Society v88 n14 p3456-7 Jul 20 1966.

Descriptors: (*Ketones, Photochemistry), (*Free radicals, *Photochemistry), Spiro compounds, Photolysis, Dienes, Molecular properties, Mass spectrum, Deuterated compounds.

Identifiers: Spiro octadienones, Rearrangement reactions.

Mass spectrum analysis of the photolysis products of deuterated spiro (2-5) octa-4,7-dien-6-one-1,1,2,2-04 provided evidence of an intramolecular 1,2-hydrogen shift.

AD-641 271 **Field 7E, 11G, 21D**
CFSTI Prices: HC$2.00 MF$0.50
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
DERIVATIVES OF 8-QUINOLINOL.
Progress rept.
by Marjan Kolobielski. Aug 66, 26p CCL-207
Proj. DA-1L013001A039

Descriptors: (*Antioxidants, Quinolinols), (*Corrosion inhibition, Quinolinols), (*Quinolinols, Synthesis (Chemistry)), Dissociation, Stability, Surface properties, Molecular structure, Alcohols, Ethers, Amines, Polymers, Fuel additives.

The overall objective of this project is the establishment of the relation of the hydrophilic-lipophilic ratios of chelating compounds and selected solvents to the corrosion inhibitory action of these compounds in various solvents. Dechelates of 8-quinolinol containing different substituents were selected as the chelates for the initial investigation of physical properties such as dissociation constants, stability constants, hydrophilic-lipophilic ratios and of their corrosion inhibitory action. The results obtained may also allow one to relate the effect on corrosion inhibition of the molecular structure of these derivatives. In this study the needed derivatives were prepared in high purity and their structure proved by the use of non-equivocal synthetic means. The majority of the compounds are new products derived from 8-quinolinol and containing groups such as alkyl, hydroxy, alkoxy, amine and polyethylenoxy. The new compounds besides being considered as corrosion inhibitors may in some cases be potential additives for liquid fuels as antioxidants and metal deactivators, and will be screened for such possibilities. (Author)

AD-641 272 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
THE LUMINESCENCE OF RARE-EARTH PHTHALOCYANINES,
by M. G. Gurevich, and K. N. Solovev. Aug 66, 10p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-1P014501A31B
NCH-202 858, ERDL-T-1864-66
Luminestsenzya Redkozemelnych Ftalozyaninov, trans. of Akademiya Navuk BSSR, Minsk. Doklady, v5 n7 p291-4 1961.

Descriptors: (*Rare earth compounds, Luminescence), (*Phthalocyanines, *Luminescence), Complex compounds, Porphyrins, Synthesis (Chemistry), Physical properties, USSR.

Rare earth phthalocyanine complexes were obtained by the action of ortho-cyanbenzamide on rare earth halides. The spectral luminescence characteristics of the compounds are reported. Evidence was obtained indicating intramolecular energy migration in a porphyrin ring.

N66-37595 **Field 7E**
CFSTI Prices HC$1.00 MF$0.50
Societa Ricerche Impianti Nucleari, Saluggia (Italy). Centro Ricerche Nucleari.
CONTINUOUS MEASUREMENT OF GASEOUS MIXTURES BY THE ABSORPTION OF WEAK X-RAYS.
Mesure En Continu De La Concentration De Melanges Gazeux Par L'absorption Des Rayons X Mous
by A. Bruna, and P. G. Caldera. 1966, 21p
SORIN-93
Presented At The Study Sessions On The Use Of Radioelem. In Chem. And Petrol. Ind., Marseille 16-17 Jun. 1966 Supported By Euratom

Descriptors: *Gas mixture, *Silicon compound, *X-ray absorption, Absorption, Application, Chloroform, Compound, Concentration, Deposition, Electronic, Epitaxy, Gas, Hydrogen, Industry, Inorganic, Measurement, Mixture, Physical, Silane, Silicon, Weak, X-ray.

For abstract, see STAR 04 22.

PB-173 234 **Field 7E, 7C**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CORRELATIONS ENTRE STRUCTURE ET ABSORPTION INFRAROUGE DE COMPOSES MONODEUTERIES: CONTRIBUTION A L'ETUDE DES COMPOSES ORGANOMAGNESIENS (Correlation Between the Structure and Infra-Red Absorption Characteristics of Mono-Deuterated Compounds: Contribution to the Study of Organo-Magnesium Compounds).
Doctoral thesis,
by Alain Paillous. 29 Oct 65, 40p CEA-R-2934
Text in French; Attached Summary in English.

Descriptors: (*Metalorganic compounds, *Deuterated compounds), (*Magnesium compounds, Metalorganic compounds), (*Infrared spectroscopy, Metalorganic compounds), Molecular structure, Absorption spectrum, Chemical bonds, Molecular association, Stereochemistry, France.

Identifiers: Molecular conformations.

The high sensitivity of the nu (C-D) vibration to the variations brought about by the substitution of the carbon attached to the deuterium is shown in the case of organic or organo-metallic monodeuterated molecules. In particular, syntheses of various mono-deuterated organo-magnesium compounds were carried out; results are given concerning an infra-red spectrometric examination of these compounds in the range 2100-2250/cm. The results show the existence of only one type of deuterated carbon, which suggests that the same carbanion is involved in various ionic associations for the different magnesium-containing compounds. (Author)

PB-173 186 **See Field 18J**

8A. BIOLOGICAL OCEANOGRAPHY

AD-640 977 **Field 8A, 17I, 9F**
CFSTI Prices: HC$2.00 MF$0.50
Woods Hole Oceanographic Institution, Mass.
RADIO-TAGGING OF WHALES.
Technical rept.,
by William E. Schevill, and William A. Watkins. May 66, 30p WHOI-Ref-66-17
Contract Nonr-4446 (00)

Descriptors: (*Cetacea, *Tracking), Radio transmitters.

The authors recount a series of attempts to tag and track whales at sea without catching them. Radio transmitters of 140 Mc were attached to the backs of whales from helicopters. Tracking the tagged whales was attempted by ship and by airplane receiving systems. (Author)

N66-36432 **Field 8A**
CFSTI Prices HC$7.00 MF$2.00
New York Academy Of Sciences, N. Y.
MARINE BIOLOGY, VOLUME II.
by C. H. Oppenheimer. 1966, 388p NASA-CR-77921
NASA ORDER R-144
Proc. Of The 2d Intern. Interdisciplinary Conf., Princeton, N. J., 21-24 Oct. 1962, Sponsored In Part By Onr

Descriptors: *Biology, *Conference, *Ecological system, *Microorganism, *Plankton, Control, Cycle, Distribution, Ecology, Growth, Light, Marine, Morphology, Nutrition, Population, Rate, Sampling, Sinking, Transport.

For abstract, see STAR 04 22.

AD-640 922 See Field 6C

AD-640 980 See Field 8C

AD-640 982 See Field 8G

8B. CARTOGRAPHY

AD-641 276 Field 8B
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc. Washington, D. C.
PHOTOGRAMMETRIC PLOTTING INSTRUMENTS,
by Marchik Sbanek. Oct 66, 16p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-4A635101D855
TT-66-62542, ERDL-T-1878-66
Fotogrammetricke Vyhodnocovaci Pristoje, trans. of Geodeticky a Kartograficky Obzor (Czechoslovakia), N ;< (54) p45-8 1966.

Descriptors: (*Plotters, *Photogrammetry), Czechoslovakia.

The instruments described include the stereotrigomat equipped with a differential transposing device, the universal plotting instrument used in precise aerial triangulation, graphic and numerical plotting, and in achieving transposed photos of a hilly terrain; and the analytical plotting instrument AP-C.

PB-173 350 Field 8B
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana.
SOIL STRIP MAPS.
Civil engineering studies,
by T. H. Thornburn, and T. K. Liu. Feb 66, 12p
Rept. no. 19, Soil mechanics series-11
Proj. IHR-12
Prepared in cooperation with State of Illinois Division of Highways and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Mapping, Soils), (*Photogrammetry, Photointerpretation), Continuous-strip cameras, Aerial photography, Photogeology, Geological survey, Illinois.

Identifiers: Pedology.

Two pedologic soil strip maps that were prepared for a 5 mile section of proposed interstate highway alignment in Woodford and McLean Counties, Ill., are compared. One map was made by photo interpretation procedures utilizing 1:20,000 and 1:9,600 scale photography in conjunction with available soil reports, soil association maps, and geologic information, but without field mapping. The other map was made subsequent to the completion of the airphoto map by the Area Soil Scientist of the Soil Conservation Service using standard field procedures of agricultural soil survey. The surficial deposits consist of glacial till covered by a layer of loess of variable thickness. Both light and dark colored soils developed under forest and prairie vegetation, respectively, were represented. Comparison maps were prepared on the basis of pedologic soil series, profile drainage characteristics, Great Soil Groups and parent materials. (Author)

AD-640 589 See Field 8E

AD-640 799 See Field 8E

8C. DYNAMIC OCEANOGRAPHY

AD-640 576 Field 8C
CFSTI Prices: HC$2.00 MF$0.50
Hawaii Inst. of Geophysics, Honolulu.
SOME NUMERICAL HYDRODYNAMICS FOR HILO HARBOR,
by Harold G. Loomis. Jul 66, 29p HIG-66-7
Contract Nonr-3748 (03)
Proj. NR-083-168

Descriptors: (*Ocean waves, *Harbors), Hawaii, Numerical methods and procedures, Hydrodynamics.

The work was directed toward finding some understanding of the behavior of tsunamis at Hilo, Hawaii. Difference equations for a grid of 32 points corresponding to the variable depth, shallow water wave equation are solved for steady-state solutions. A number of time-varying solutions are found or a number of inputs at the harbor entrance. (Author)

AD-640 786 Field 8C
Not available from CFSTI.
Miami Univ., Coral Gables, Fla. Inst. of Marine Science.
THE LOCATION OF THE TERMINATION AREA OF THE EQUATORIAL UNDERCURRENT IN THE GULF OF GUINEA BASED ON OBSERVATIONS DURING EQUALANT III.
Revised ed.,
by M. O. Rinkel, P. Sund, and G. Neumann. 29 Apr 66, 9p
Contract Nonr-4008 (02)
Revision of manuscript submitted 8 Jan 66. The work by New York University was supported by Contract Nonr-285 (57).
Availability: Published in Journal of Geophysical Research v71 n16 p3893-3901 Aug 15 1966.

Descriptors: (*Ocean currents, Atlantic ocean), Salinity, Measurement, Determination.

Identifiers: Equalant III program.

During the Equalant III program in the spring of 1964, the Equatorial Undercurrent in the eastern part of the Atlantic Ocean was followed into the inner part of the Gulf of Guinea. The high-salinity core associated with this current maintained salinities of more than 36.2 parts per thousand as far east as the Island of Sao Tome. Near 6 1/2 deg E the subsurface salinity maximum turned to a southeasterly direction, its maximum salinity gradually decreasing in the core. Salinities in excess of 36.2 parts per thousand could be observed as close as 150 km off the coast of Africa near 1 deg 20 min S. Current-drogue measurements in and around the high-salinity core indicate that in April 1964 the undercurrent terminated very close to the Island of Sao Tome. (Author)

AD-640 800 Field 8C
CFSTI Prices: HC$3.00 MF$0.75
Hydronautics, Inc., Laurel, Md.
FLOW PHENOMENA CAUSED BY THE COLLAPSE OF A MIXED REGION IN A DENSITY-STRATIFIED MEDIUM.
Technical rept.,
by Jin Wu. Mar 66, 60p TR-231-11
Contract Nonr-3688 (99)
Proj. NR-220-016

Descriptors: (*Ocean waves, Fluid dynamic properties), (*Ocean currents, Fluid dynamic properties), Density, Oscillation, Propagation, Ocean models.

Identifiers: Stratified media.

Various phenomena are caused by the collapse of a mixed region in a model ocean; these include internal waves propagated in the linear-stratified medium below the thermocline, interfacial waves at the density-discontinuous interface (thermocline) and surface currents at the free surface. Results include the wave and orbital motions produced outside of the collapsing region for a number of different density stratifications. Regular internal waves of progressive oscillatory type propagating along the isopycnic lines can be scaled according to the length scale of the mixed region and the inverse time scale of the linear-stratified medium (Vaisala frequency of the medium). The value of the density jump at the thermocline determines whether the interfacial wave is characterized by the modeled thermocline and is essentially of a shallow water wave type, or is characterized by the lower stratified field and is essentially an internal wave disturbance. A series of divergences or convergences (surface sloshing currents) was observed at free surface; the general pattern of these currents shows that the water particles oscillated sinusoidally with time at each station, and that particles separated by approximately half an interfacial wave length oscillated exactly out of phase. (Author)

AD-640 980 Field 8C, 8J, 8A, 8G K
CFSTI Prices: HC$5.00 MF$1.00
Navy Electronics Lab., San Diego, Calif.
THE U. S. NAVY ELECTRONICS LABORATORY'S OCEANOGRAPHIC RESEARCH TOWER: ITS DEVELOPMENT AND UTILIZATION.
Research and development rept. Jun 55-Dec 65,
by E. C. LaFond. 22 Dec 65, 157p NEL/1342
Proj. SR-004-04-01
Task 0580 (NEL-L40461)

Descriptors: (*Towers, *Oceanology), Oceanographic equipment, Marine biology, Marine geology, Chemical properties, Fluid dynamic properties, Electromagnetic waves, Underwater sound, Navy.

Part I of the report outlines the tower's many advantages over other methods for conducting shallow water research. Part II covers the various investigations, the specialized techniques and instrumentation employed, and the results achieved. Part III traces the tower's development and surveys its unique facilities. Part IV delineates the need for a new tower in 100 feet of water. Also included in this section are a summary of the work, a list of recommendations, and a bibliography. (Author)

AD-641 085 Field 8C
CFSTI Prices: HC$3.00 MF$0.50
Navy Electronics Lab., San Diego, Calif.
INTERNAL TIDES OFF SOUTHERN CALIFORNIA.
Research and development rept., Aug 63-Feb 64,
by W. Krauss. 6 Jul 66, 57p Rept. no. NEL-1389
Proj. SR-104-03-01
Task 0580

Descriptors: (*Pacific Ocean, *Tides), Doppler effect, California, Ocean waves.

A method accounting for doppler-shift effects was used to interpret data recorded from San Diego to Hawaii by moving thermistors. Results lead to a reasonable picture of the internal tides in that area of the Pacific Ocean. Internal tidal waves are an important component in the spectra at tidal frequencies in the sea off southern California. It is likely that they travel in a northeasterly direction. (Author)

AD-641 136 Field 8C
CFSTI Prices: HC$3.00 MF$0.75
Army Coastal Engineering Research Center, Washington, D. C.
CERC BULLETIN AND SUMMARY REPORT OF RESEARCH PROGRESS FOR FISCAL YEARS 1965-66. VOLUME II.
1966, 79p
See also AD-616 998.

Descriptors: (*Oceanology, Seacoast), (*Seacoast, Civil engineering), Ocean waves, Tides, Ocean currents, Beaches, Surveying, Samplers, Sedimentation, Erosion, Transport properties.

Contents: Effect of wave action on tidal stages along the coast of Florida, March 1962; Longshore currents at Nags Head, North Carolina; Study of pilot beaches in New England for the improvement of coastal storm warning; The Sears sea sled for surveying in the surf zone; Heights of waves generated by a flap-type wave generator;

Scuba diving to investigate in-situ behavior of mobile suspended-sediment sampler; Progress reports on research sponsored by the Coastal Engineering Research Center.

AD-640 982 **See Field 8G**

8D. GEOCHEMISTRY

N66-30297 **Field 8D**
CFSTI Prices HC$3.00 MF$0.75
California Univ., Berkeley. Space Sciences Lab.
THE ORGANIC GEOCHEMISTRY OF ANCIENT SEDIMENTS, PART II.
by T. Belsky, A. L. Burlingame, M. Calvin, P. Haug, and R. B. Johns. 15 Feb 66, 116p NASA-CR-70789
Grant NSG-101-61
Submitted For Publication Its Ser. No. 7, Issue No. 8

Descriptors: *Chemical analysis, *Gas chromatography, *Hydrocarbon, *Mass spectrometry, Alkane, Analysis, Chemical, Chromatography, Content, Evolution, Extraction, Gas, Homology, Life, Mass, Oil, Organic, Process, Rock, Sediment, Shale, Spectrometry.

For abstract, see STAR 04 17.

N66-30326 **Field 8D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BUTLER, MISSOURI - AN UNUSUAL IRON METEORITE.
by J. I. Goldstein. May 66, 15p NASA-TM-X-55499, X-641-66-225
Submitted For Publication

Descriptors: *Cobalt, *Cooling, *Germanium, *Iron meteorite, Content, Environment, Iron, Kamacite, Meteorite, Phase, Rate.

For abstract, see STAR 04 17.

N66-30799 **Field 8D**
CFSTI Prices HC$1.00 MF$0.50
California Univ., San Diego. Dept. Of Chemistry.
ANALYSIS OF THE ORGANIC AND INORGANIC CONSTITUENTS OF CARBONACEOUS AND OTHER SELECTED STONY METEORITES SEMIANNUAL STATUS REPORT, 1 NOV. 1965 - 1 MAY 1966.
by B. Nagy, and H. C. Urey. 12 Jul 66, 6p NASA-CR-76331
Grant NSG-541

Descriptors: *Carbonaceous meteorite, *Chemical analysis, *Stony meteorite, Analysis, Carbonaceous, Chemical, Composition, Constituency, Inorganic, Meteorite, Organic, Quality, Stone.

For abstract, see STAR 04 17.

N66-31212 **Field 8D**
CFSTI Prices HC$3.00 MF$0.50
Shell Development Co., Emeryville, Calif.
DEVELOPMENT OF ANALYTICAL TECHNIQUES FOR HYDROCARBONS IN MINERAL AGGREGATES.
by A. G. Polgar, and D. P. Stevenson. Jul 66, 55p NASA-CR-519
Contract NASW-438

Descriptors: *Chemical composition, *Hydrocarbon, *Meteorite, *Sedimentary rock, Alkane, Assay, Chemical, Composition, Constituency, Core, Limestone, Ocean, Organic, Precambrian, Rock, Sediment, Shale, Terrestrial.

For abstract, see STAR 04 17.

BNWL-235-3 **See Field 8G**

8E. GEODESY

AD-640 589 **Field 8E, 8B, 14E**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
TEST RESULTS OF A HIGH-SPEED CAPPING SHUTTER FOR LARGE-APERTURE GEODETIC CAMERAS.
Instrumentation papers,
by M. S. Tavenner, and D. G. Abby. Jun 66, 36p AFCRL-IP-101, AFCRL-66-405
Proj. AF-7600
Task 760006

Descriptors: (*Camera shutters, Tests), (*Geodesics, Spacecraft cameras), Scientific satellites, Photogrammetry, Azimuth, Surveying.

Experiments were made with passive satellites for obtaining geodetic information using methods of stellar triangulation. Camera shutters for large-aperture cameras have presented a severe problem in timing. Using a contractor-developed capping shutter, a series of field tests was conducted with the Air Force's PC-1000 Geodetic Stellar Camera System for observations of the Echo I satellite. The report is concerned with the results of this test series and an evaluation of the capping shutter as adapted to the PC-1000 camera system. (Author)

AD-640 799 **Field 8E, 8B**
CFSTI Prices: HC$3.00 MF$0.75
Raytheon Co., Alexandria, Va. Autometric Operation.
FICTITIOUS DATA GENERATOR FOR ANALYTICAL AEROTRIANGULATION.
Final technical rept.
Sep 65, 83p
Contract DA-44-009-AMC-741 (X)
Task 4A623501D85306

Descriptors: (*Aerial photography, Surveying), (*Geodesics, Photogrammetry), Programming (Computers), Data, Simulators, Analysis, Errors, Azimuth, Tests.

Identifiers: Aerotriangulation.

The report describes the development of a computer program designed to produce fictitous data for the testing of extensive programs of analytical aerotriangulation. The program generates the positions of ground points and exposure stations and the angular orientation elements for the photographs. From these, the theoretically correct image coordinates are computed. The correct image coordinates can be perturbed to simulate the effects of lens distortion, atmospheric refraction, film shrinkage, and normally distributed measuring errors. The number of photographs per flight, the number of parallel flights, and the number of image points per photograph can be selected by the operator. The area to be photographed can be located anywhere on the earth's surface, and the flight lines can be at any azimuth. Any geodetic figure can be adopted. The program has been used to generate several large blocks of data for testing other routines. (Author)

N66-30255 **Field 8E**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE EQUATORIAL ELLIPTICITY OF THE EARTH AS SEEN FROM FOUR MONTHS OF SYNCOM II DRIFT OVER THE WESTERN PACIFIC.
by C. A. Wagner. Jul 66, 32p NASA-TN-D-3313

Descriptors: *Drift rate, *Earth shape, *Equatorial orbit, *Gravitational field, *Orbital motion, *Synchronous communications (syncom-ii) satellite p, Communication, Dependence, Drift, Earth, Ellipse, Equator, Field, Gravity, Longitudinal, Motion, Orbit, Orbital, Rate, Satellite, Shape, Synchronous, Syncom satellite.

For abstract, see STAR 04 17.

N66-31370 **Field 8E**
CFSTI Prices HC$3.00 MF$0.75
Ohio State Univ. Research Foundation, Columbus. Dept. Of Electrical Engineering.
MICROWAVE RADIOMETRIC TEMPERATURES OF TERRAIN.
by R. L. Riegler. 30 Jun 66, 74p NASA-CR-76391
Contract NSR-36-008-027
Its Rept.-1903-2

Descriptors: *Antenna, *Microwave radiometer, *Surface temperature, *Temperature measurement, Calibration, Computer, Design, Equation, Measurement, Microwave, Model, Pattern, Program, Radiation, Radiometer, Surface, Temperature, Terrain.

For abstract, see STAR 04 17.

N66-32134 **Field 8E**
CFSTI Prices HC$2.00 MF$0.50
Washington Univ., Seattle. Dept. Of Atmospheric Sciences.
ON THE USES OF INTERMEDIATE INFRARED AND MICROWAVE INFRARED IN METEOROLOGICAL SATELLITES THIRD SEMIANNUAL REPORT.
by K. J. Buettner, R. W. Dana, K. Katsaros, W. T. Kreiss, and I. Stuetzer. Mar 66, 32p NASA-CR-76620
Grant NSG-632

Descriptors: *Infrared radiation, *Meteorological satellite, *Microwave spectrum, *Nimbus satellite, Analysis, Data, Grid, High resolution, Infrared, Intermediate, Meteorology, Microwave, Model, Point, Radiation, Satellite, Spectrum.

For abstract, see STAR 04 17.

AD-640 956 **See Field 8I**

AD-640 964 **See Field 16B**

AD-641 274 **See Field 17H**

8F. GEOGRAPHY

N66-37488 **Field 8F, 5**
CFSTI Prices HC$2.00 MF$0.50
Technische Univ., Berlin (West Germany). Institut Fuer Raumfahrttechnik.
SOCIO-ECONOMIC MODEL OF THE PLANET EARTH ("SEMPE"). REPORT NO. 1 - COMPREHENSIVE PROJECT DESCRIPTION.
Sozio-oekonomisches Modell Des Planeten Erde. Bericht No. 1 - Zusammenfassende Projektbeschreibung
by H. H. Koelle. 30 Sep 65, 28p TUB-IR-1965/3 3
In German

Descriptors: *Earth, *Economics, *Mathematical model, *Sociology, Cost, Effectiveness, Efficiency, Finance, Geography, Growth, Measurement, Operation, Performance, Planet, Program, Ratio, Simulation, Space, System.

For abstract, see STAR 04 22.

N66-37521 **Field 8F**
CFSTI Prices HC$1.00 MF$0.50
Kansas Univ., Lawrence. Engineering Science Div.
FUTURE AND PRESENT NEEDS OF REMOTE SENSING IN GEOGRAPHY.
by D. S. Simonett. 1966, 14p NASA-CR-78400,

CRES-61-12
Contract NSR-17-004-003
Presented At The 4th Symp. On Remote Sensing Of The Environment, Mich. Univ., Ann Arbor, 11-14 Apr. 1966

Descriptors: *Data analysis, *Geography, *Information processing, *Sensing, Automatic, Data, Handling, Illustrative, Instrument, Material, Method, Program, Remote, Research, Teaching.

For abstract, see STAR 04 22.

8G. GEOLOGY AND MINERALOGY

AD-640 982 **Field 8G, 8J, 8A, 8C, 8K**
CFSTI Prices: HC$2.00 MF$0.50
Oregon State Univ., Corvallis. Dept. of Oceanography.
CRUISE REPORT: YALOC 66.
Technical rept.,
by Susan Borden. Sep 66, 35p TR-74, Ref-66-10
Contracts Nonr-1286 (10), Nonr-1286 (09)
Projs. NR-083-600, NR-083-102
Grants NSF-GB-4629, NSF-GP-5317

Descriptors: (*Marine geology, *Oceanographic data), Sea water, Marine geophysics, Chemical properties, Gravity, Terrestrial magnetism, Marine biology, Bathythermographs.

Identifiers: Mohole project.

The cruise was arranged so that the YAQUINA could participate in Mohole investigations off Hawaii. Geophysical, chemical, and hydrographic data were collected en route to Honolulu during May 1966. The leg from Honolulu to Adak made possible collections of samples of deep water for studies of its physical and chemical properties and some experiments to determine productivity. Work near the Aleutian Islands was principally measurement of gravity and magnetism; hydrographic data were also collected. Dredging on a seamount and on the deep sea floor was the major effort in the Gulf of Alaska; hydrographic casts and one otter trawl were also made. A gravity run into Dixon Entrance, several trawls, hydrographic stations, and monitoring the Newport line comprised the work on the leg from Ketchikan to Newport. The events of the cruise are given in the narrative of the voyage, written by Dr. Park, who was on board for all parts of the cruise, except the Mohole work off Hawaii. A brief summary of the studies made and sampling programs conducted has been written for each area of oceanography by a member of the scientific party who was on board during the last leg of the voyage. (Author)

BNWL-235-3 **Field 8G, 8H, 8D**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PACIFIC NORTHWEST LABORATORY ANNUAL REPORT FOR 1965 IN THE PHYSICAL SCIENCES. VOLUME 3. EARTH SCIENCES,
by D. W. Pearce, and J. K. Green. May 66, 76p
Contract AT (45-1)-1830

Descriptors: (*Geology, Nuclear physics), (*Scientific research, Nuclear engineering).

For abstract, see NSA 20 21.

N66-30487 **Field 8G**
CFSTI Prices HC$1.00 MF$0.50
Northrop Space Labs., Hawthorne, Calif.
DEVELOPMENT OF TECHNOLOGICAL CONCEPTS LEADING TO THE BENEFICIAL USE OF LUNAR MAGMA PRODUCTS FIFTH TECHNICAL PROGRESS REPORT, APR. - JUN. 1966.
by E. Azmon. 1966, 13p NASA-CR-76165
Contract NAS7-358

Descriptors: *High temperature research, *Liquefaction, *Phase transformation, *Rock, *Solid state, Analysis, Basalt, Feldspar, Glass, High temperature, Igneous, Liquid, Mineralogy, Phase, Research, Serpentine, Solid, State, Transformation.

For abstract, see STAR 04 17.

N66-32110 **Field 8G**
CFSTI Prices HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile And Space Systems Div.
EXPERIMENTAL INVESTIGATION OF ULTRA-HIGH VACUUM ADHESION AS RELATED TO THE LUNAR SURFACE EIGHTH QUARTERLY PROGRESS REPORT AND SECOND YEAR SUMMARY, 1 APR. - 30 JUN. 1966.
by J. A. Ryan. 26 Jun 64, 48p NASA-CR-76430, DAC-59288
Contract NAS7-307

Descriptors: *Adhesion, *Lunar surface, *Silicate, *Ultrahigh vacuum, Behavior, Crystal, Force, Friction, Load, Lunar, Material, Orientation, Surface, Temperature, Ultrahigh, Vacuum.

For abstract, see STAR 04 17.

N66-37366 **Field 8G**
CFSTI Prices HC$4.25 MF$2.00
Geological Survey, Flagstaff, Ariz.
INVESTIGATION OF IN SITU PHYSICAL PROPERTIES OF SURFACE AND SUBSURFACE SITE MATERIALS BY ENGINEERING GEOPHYSICAL TECHNIQUES ANNUAL REPORT, FISCAL YEAR 1966.
by J. S. Watkins. Jul 66, 373p NASA-CR-65502
NASA ORDER T-25091/G/

Descriptors: *Geology, *Lunar soil, *Perography, *Shear strength, *Water content, Bearing, Blast, Cost, Density, Detonation, Material, Moisture, Nasa program, P wave, Physical, Property, Volcanic.

For abstract, see STAR 04 22.

PB-173 366 **Field 8G**
CFSTI Prices: HC$2.00 MF$0.50
California State Dept. of Public Works. Dept. of Materials and Research.
FIELD EVALUATION OF A TELEVISION BORE HOLE TELESCOPE.
Final rept.,
by Duane D. Smith. 25 Jul 66, 35p M/R-226468
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Well logging, Television equipment), (*Foundations (Structures), Visual inspection), (*Telescopes, *Television equipment), Performance (Engineering), Civil engineering.

An Eastern International Television Bore Hole Telescope FB400 was used to examine borings and was evaluated as a tool for obtaining data for the design of cut slopes and other foundation investigations. The study involved the examination of 10 borings by means of a cylindrical television probe, 2 1/2 in. in diameter by 4 ft 7 in. The boring depths ranged from 100-175 feet. Observations were displayed on a television screen. A camera was used to photograph important features shown on the TV SCREEN. Numerous fractures and joints were observed in the borings. depth measurements and measurement of planar features, such as the attitudes of certain beds, were made on observations. It was concluded that the use of the television equipment is feasible as a tool for obtaining data on subsurface conditions; however, it is suggested that it be used to supplement core samples, drill logs and surface geology. (Author)

AD-640 841 **See Field 8K**

AD-640 980 **See Field 8C**

8H. HYDROLOGY AND LIMNOLOGY

AD-640 831 **See Field 13B**

BNWL-235-3 **See Field 8G**

8I. MINING ENGINEERING

AD-640 956 **Field 8I, 8E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ACCOUNTING FOR SELENO-SOLAR TIDAL INFLUENCES IN GRAVIMETRIC MEASUREMENTS,
by E. A. Mudretsova. 18 Apr 66, 15p FTD-TT-65-739
TT-66-62510
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geologiya i Razvedka (USSR). v5 n10 p113-9 1962.

Descriptors: (*Gravity, *Tides), (*Mining engineering, Measurement), Corrections, Moon, USSR.

When reducing gravimetric measurements in underground mining developments at pyrite deposits in the middle Urals it is necessary to take into account seleno-solar tidal influences on measurement results.

8J. PHYSICAL OCEANOGRAPHY

AD-640 980 **See Field 8C**

AD-640 982 **See Field 8G**

8K. SEISMOLOGY

AD-640 637 **Field 8K**
CFSTI Prices: HC$1.00 MF$0.50
Saint Louis Univ., Mo. Dept. of Geophysics and Geophysical Engineering.
ANNUAL TECHNICAL REPORT,
by Carl Kisslinger. 1 Sep 66, 24p
Contracts AF 19 (628)-5100, ARPA Order-292

Descriptors: (*Earthquakes, Alaska), (*Seismic waves, *Explosions), Structural geology, Seismographs, Rayleigh scattering.

During the course of the year the principal technical accomplishments have included efforts in the following areas: the focal mechanism of earthquakes, model studies of explosion generated waves, azimuthal departure of P wave motion from the great circle path, determination of the depth of focus, and the phase velocity of surface waves. Each of these studies is reported. Other supporting work, not reported in the present work, has been the operation of a quadrilateral long-period seismic array and the installation of a small aperture, three element, bore-hole seismometer array in southeast Missouri.

AD-640 841 **Field 8K, 8G**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Dept. of Geology and Geophysics.
A SEISMIC SCALE-MODEL STUDY OF REFRACTION ARRIVALS IN A THREE-LAYER STUCTURE.
Special technical rept.,
by David E. Siskind. 21 Jun 66, 48p
Contract AF 19 (628)-238, ARPA Order-180-61
Proj. AF-8652
Task 865208
AFCRL-66-571
Also includes Studies of the Effect of Depth of Focus on Seismic Pulses.

Descriptors: (*Seismic waves, *Structural geology), Refraction, Velocity, Frequency, Low-pass filters, Fourier analysis, Mathematical models.

One of the uses of seismic waves is in the study of crust-mantle relationships. A crustal model having a narrow intermediate-velocity layer was postulated for comparison with another model, previously studied, having a narrow region of constant velocity gradient. Both models have their narrow regions bounded above by a low-velocity region and below by a region of higher velocity. It was shown experimentally that the same relationship between the velocity gradient and cutoff frequency was found for both studies, with the cutoff frequency being 1.7 times the velocity gradient. The cutoff frequency is defined as the frequency at which the spectrum of the refracted arrival begins to fall off rapidly from the spectrum of the direct wave. A part of the effect is accounted for by noting the theoretically expected fall off of the refracted from the direct spectra of 6 db/octave. (Author)

AD-640 842 **Field 8K, 18C**
CFSTI Prices: HC$4.00 MF$0.75
Pennsylvania State Univ., University Park. Dept. of Geology and Geophysics.
AN EVALUATION OF A METHOD FOR FOCAL-DEPTH DETERMINATION OF SEISMIC DISTURBANCES FROM UNDERGROUND NUCLEAR EXPLOSIONS.
Special technical rept.,
by Jin-Long Lin. 15 Jul 66, 109p
Contract AF 19 (628)-238, ARPA Order-180-61
Proj. AF-8652
Task 865208
AFCRL-66-570
Also includes Studies of the Effect of Depth of Focus on Seismic Pulses.

Descriptors: (*Underground explosions, *Seismic waves), (*Seismology, *Nuclear explosions), Seismographs, Epicenter, Blast Earthquakes, Programming (Computers).

Identifiers: Shoal project, Salmon event, Bilby event, Mississippi event.

The Watson-Merdler method for determination of focal depths was applied to fourteen seismograms from underground nuclear explosions. Because the depths for blasts are less than 1 km, the true time delta t for the actual surface reflection was not tested. 200 cases where concentration ratio, C sub R, was greater than in the original seismogram and where the area under the seismogram was reduced were investigated. Causes which can produce simplification are: (1) Deconvolution removes the pP sequence from the seismogram. (2) Deconvolution removes PcP or some other sequence other than pP. (3) Deconvolution produces a larger maximum amplitude in the deconvolved seismogram than in the original. (4) Deconvolution diminishes amplitudes on the seismogram. (5) Deconvolution phases random noise so as to add to or subtract from the principal peaks of the seismic pulse. The doublet-function hypothesis for a seismogram is too simple and is therefore unrealistic. The simplicity criterion may identify many pulses in addition to the pP pulse on the seismogram. The Watson-Merdler method does not show promise to distinguish blasts from earthquakes. (Author)

AD-641 125 **Field 8K**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Geo-Astrophysics Lab.
MICROPULSATION MEASUREMENTS DURING THE PUGET SOUND EARTHQUAKE OF APRIL 29, 1965,
by James F. Kenney, and Leonard E. Johnson.
Aug 66, 18p D1-82-0535

Descriptors: (*Earthquakes, Seismology), Measurement, Puget Sound, Magnetic fields.

The emf's induced in micropulsation coils were analyzed to compute an epicenter and to look for possible magnetic signals generated by the Puget Sound earthquake of April 29, 1965. The epicenter calculated by this method agrees with that published by Algermissen and Hardy (1965) within the limits of experimental error. The search for magnetic precursors yielded negative results. The upper limit to the dipole moment of the stressed region was determined to be 2.5 x 10 to the 13th power cgs emu. It is concluded that, at least in this area, the possibility of using the piezomagnetic effect as a useful pre-indication of earthquake activity is rather remote. (Author)

AD-641 160 **Field 8K**
CFSTI Prices: HC$4.00 MF$1.00
National Observatory of Athens (Greece). Seismological Inst.
FORESHOCK AND AFTERSHOCK SEQUENCES OF SOME LARGE EARTHQUAKES IN THE REGION OF GREECE,
by B. Papazachos, N. Delibasis, N. Liapis, G. Moumoulidis, and G. Purcaru. 1 Jul 66, 143p
Scientific-5
Contract AF 61 (052)-803
Proj. AF-9714
AFOSR-66-2416

Descriptors: (*Earthquakes, Greece), Seismic waves, Seismology, Deformation, Distribution.

Deformation characteristics, magnitude and time distributions of the large aftershocks which occurred in the region of Greece from 1926 till 1964 are investigated. An approximate relation between the number of aftershocks and the magnitude and focal depth of the main shock has been found. Also, an approximate relation has been derived between the magnitude of the largest aftershock and the magnitude and focal depth of the main shock. The largest aftershock occurs within fourteen days after the main shock. In many cases large 'late aftershocks' occur one or more months after the main shock. One or more foreshocks of magnitude larger than 3.8 occurred in forty per cent of the cases. The probability for an earthquake to be preceded by a large foreshock not much smaller than the main shock is 10%. It is shown that some properties of the earth's material in the aftershock region can be derived by studying the magnitude distribution and deformation characteristics of the aftershocks. (Author)

AD-641 184 **Field 8K**
Not available from CFSTI.
California Univ., Los Angeles. Inst. of Geophysics and Planetary Physics.
TRANSMISSION OF RAYLEIGH WAVES AT A CORNER,
by A. K. Mal, and L. Knopoff. 12 Aug 65, 14p
Grant AF-AFOSR-710-65
Proj. AF-8562
AFOSR-66-1324
Availability: Published in Bulletin of the Seismological Society of America v56 n2 p455-66 Apr 1966.

Descriptors: (*Wave transmission, *Mechanical waves), Seismic waves, Propagation, Wedges, Green's function; Integral equations, Potential theory.

Identifiers: Rayleigh waves.

Using a Green's function method of approximation, transmission and reflection coefficients are computed for the problem of Rayleigh waves normally incident upon the corner of a homogeneous elastic wedge formed by two stress-free planes. The Rayleigh waves are incident from infinity and travel along one surface of the wedge. The transmitted waves on the second surface and the reflected waves on the first surface are calculated by the application of Huygens' principle. A pair of coupled integral equations for the displacements are obtained by means of a representation theorem. Neglecting the diffracted body waves near the corner, the coupled integral equations are reduced to a pair of algebraic equations. A new feature of the calculation involves consideration of diffracted surface waves travelling toward the vertex. Numerical values of the phase shifts and attenuation factors in the transmitted and reflected waves are computed as functions of the wedge angle. Comparison with experimental results show considerably better agreement than has been obtained previously. (Author)

AD-641 201 **Field 8K**
CFSTI Prices: HC$2.00 MF$0.50
American Committee for the Weizmann Inst. of Science, Inc., New York.
THEORETICAL SEISMOLOGY.
Final rept., 1 Jul 56-30 Jun 66,
by C. L. Pekeris. 30 Aug 66, 27p
Contract Nonr-2189 (00)
Proj. NR-081-258

Descriptors: (*Seismology, Theory), Propagation, Seismic waves, Time, Tables, Abstracts, Sound, Liquids.

Contents: Theoretical seismograms for propagation in a flat earth; Determination of theoretical seismograms for propagation in a spherical earth; Seismic travel times derived from the Pacific nuclear explosions: Revision of the Jeffreys-Bullen travel time tables; Application of rational approximations to the solution of problems in theoretical seismology.

PB-173 347 **Field 8K**
CFSTI Prices: HC$2.00 MF$0.50
Defense Research Lab., Univ. of Texas, Austin.
REPORT OF PROGRESS UNDER U. S. COAST AND GEODETIC SURVEY.
Status rept. no. 9, 9 Feb-8 May 66,
by D. W. Evertson. 16 Aug 66, 41p
Contract CGS-1198
See also PB-169 199.

Descriptors: (*Seismometers, Experimental design), Seismology, Instrumentation, State-of-the-art reviews.

Although solions compare favorably with other pressure transducers as to full scale signal to self-noise ratio, the exceptional pressure sensitivity of a solion seismometer has led to an intensive effort to discover the lowest permissible threshold pressure that self-noise will permit. Some possible mechanisms that originate noise current in a solion have been considered. Unsteady natural convection, caused by density gradients at the electrodes, may explain the predominant noise generation in conventional solions operated with the axis vertical. This effect has been simulated by an electrical analogue circuit using thermistors. Apparatus for observing solion output in the presence of a minimum of acousitc, thermal, or electrical disturbance was set up and used to test 17 solions representing five types of construction. This test made use of a vault constructed at the DRL facility and an existing seismometer vault at Albuquerque. The voluminous data records are condensed and tentatively interpreted in this report. The results are generally in accord with the theory that vertical axis solions in having an unsteady natural convection generate grosser noise. But in other cases, in which this mechanism is inapplicable, the noise is yet to be explained. On some solions with lower sensitivity, the self-noise current was not above the test system electronic noise of 5 nA. The lowest equivalent noise pressure observed was 11 x 10-5 micro bar, corresponding to a useful seismic magnification of 30,000 at a 20-sec period. A solion combining the highest pressure sensitivity with the lowest noise current recorded on the test would correspond to an equivalent noise pressure of 0.5 x 10-5 micro bar. Further analysis, solion construction, and testing to exploit and extend the current findings are under way. (Author)

8L. SNOW, ICE, AND PERMAFROST

AD-640 887 **Field 8L, 20K**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
BENDING OF CIRCULAR PLATES CONFINING AND INCOMPRESSIBLE LIQUID.
Research rept.,
by Arnold D. Kerr. Aug 66, 15p RR-187
Proj. DA-1V025001A13001

Descriptors: (*Ice, Bending), (*Loading (Mechanics), Ice), Deformation, Stresses, Deflection, Force (Mechanics).

Frozen potholes subjected to lateral loads suggest the study of the effect of the confined incompressible liquid upon the behavior of the covering ice plate. Since, for loads of short duration, no creep is expected, the plate may be assumed to behave elastically. The method of solution is described and two examples are treated in detail. A comparison of numerical results shows the strong effect of the confined incompressible liquid upon the deflections and stresses of the plate. (Author)

AD-640 967 **Field 8L**
CFSTI Prices: HC$1.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
WIND DUCT STUDIES OF DRIFTING SNOW.
Technical rept.,
by N. S. Stehle. Oct 66, 22p TR-R-488
Proj. Y-F015-11-01-025

Descriptors: (*Snow, Drift), Polar regions, Structures, Wind, Velocity, Tests, Wind tunnels, Erosion, Temperature.

Problems in logistics and maintenance resulting from blowing and drifting snow confront stations and operations in nearly all portions of the polar regions. Wind duct experiments were conducted in a cold chamber at the Naval Civil Engineering Laboratory to obtain knowledge of the mechanics of snow movement and deposition. These experiments showed that wind velocity and the avialability of snow to the wind stream contribute most to the amount of snow deposition or erosion; temperature becomes influential only when the availability of snow is limited. In addition, snow movement is not significant at wind speeds less than 20 mph unless snow is already present in the wind stream. Tests using models in the present wind duct are recommended to provide an opportunity to study rapidly the characteristics of blowing and drifting snow around novel and unique structures and other facilities. These tests, coupled with field tests, would make possible study of the most promising shapes as well as the gross characteristics of drifting snow at heights greater than 2 feet and wind speeds greater than 20 mph. (Author)

AD-641 116 **Field 8L**
CFSTI Prices: HC$7.00 MF$1.75
Cold Regions Research and Engineering Lab., Hanover, N. H.
BIBLIOGRAPHY ON SNOW ICE AND FROZEN GROUND WITHABSTRACTS. VOLUME XX,
by Frank M. Marson. Jun 66, 347p Rept. no. 12
See also AD-621 041.

Descriptors: (*Snow, Bibliographies), (*Ice, Bibliographies), (*Permafrost, Bibliographies), Abstracts, Polar regions.

The Bibliography provides a current and comprehensive coverage of basic and applied scientific research on snow, ice, and frozen ground, as well as living and working in polar regions and other cold areas.

AD-640 974 **See Field 13M**

8M. SOIL MECHANICS

AD-640 753 **Field 8M**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
THE RESPONSE OF SOILS TO DYNAMIC LOADINGS, REPORT NO. 25: MISCELLANEOUS STUDIES OF THE FORMATION OF WAVE FRONTS IN SAND.
Research rept.,
by Robert V. Whitman. May 66, 64p R66-32,
Soils-Pub-196
Contract DA-22-079-eng-224
Task 13.009
AEWES-CR-3-26
See also AD-638 027.

Descriptors: (*Soil mechanics, Shock waves), (*Sand, Shock waves), Wave transmission, Velocity, Loading (Mechanics), Theory, Compressive properties.

This report contains: (1) Data concerning the stress-strain behavior of dry Monterey sand using initial static stresses ranging from 2 to 20 psi: (a) Stress-strain curves for one-dimensional compression with rise-times on the order of 25 milliseconds and stress increments of 100 psi; (b) Dilatational wave velocities measured using ultrasonic pulses and pulses generated by a hammer blow; (2) Theory for the dispersion of a wave front passing through a system of discrete particles. (Author)

I 27.54:3 **Field 8M, 9B**
CFSTI Price: MF$1.00
Bureau of Reclamation, Denver, Colo.
SOILS TESTS COMPUTER PROGRAM.
Water resources technical pub.,
by Paul C. Knodel. 1966, 144p Research rept.,
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. $1.00.

Descriptors: (*Soil mechanics, *Programming (Computers)), Soils, Tests, Experimental data, Permeability, Adhesion, Moisture, Shear stresses, Least square method.

Electronic computer programs were written to perform the required calculations for numerous soils tests performed in the Soils Engineering Laboratory. The test programs written and currently being used by the Soils Laboratory are: natural moisture-density; gradation analysis; soil consistency (Atterberg limits); Proctor compaction; constant-head permeability-settlement; falling-head permeability; triaxial shear; one-dimensional consolidation; and a method of computing least squares for the sliding factor and direct shear test. Whenever applicable, output data show both British and metric units, with conversion from British to metric system being made in accordance with ASTM Metric Practice Guide issued in January 1964. Output data are usually printed in tabular form and include appropriate summaries. Some of the programs call for punch card output, which are utilized to plot required test curves using the Benson-Lehner electroplotter. All of the programs were written in Fortran II language for the IBM-7090 electronic computer. With very minor revisions to the existing programs, they were made to conform to the format required by a Honeywell-800 computer. (Author)

PB-173 361 **See Field 13B**

PB-173 365 **See Field 13B**

8N. TERRESTRIAL MAGNETISM

N66-30182 **Field 8N**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE EQUATORIAL ELLIPTICITY OF THE EARTH FROM TWO MONTHS OF SYNCOM II DRIFT OVER THE CENTRAL PACIFIC.
by C. A. Wagner. Jul 66, 44p NASA-TN-D-3315

Descriptors: *Gravitational field, *Synchronous communications (syncom-ii) satellite p, *Tracking study, Communications, Drift, Ellipticity, Equator, Field, Gravity, Longitude, Orbit, Pacific, Rate, Satellite, Study, Synchronous, Tracking.

For abstract, see STAR 04 17.

N66-30298 **Field 8N**
CFSTI Prices HC$4.00 MF$0.75
Dikewood Corp., Albuquerque, N. Mex.
COMPUTER PROGRAMS FOR THE GEOMAGNETIC FIELD FINAL REPORT.
by F. J. Wall. 13 Aug 65, 106p NASA-CR-67856, DC-FR-1047
Contract NAS5-3944

Descriptors: *Computer program, *Least squares method, *Spherical harmonics, Chart, Coefficient, Computer, Error, Field, Flow, Function, Geomagnetic, Harmonics, Least, List, Mapping, Method, Potential, Program, Spherical, Square, Statistical.

For abstract, see STAR 04 17.

N66-31766 **Field 8N**
CFSTI Prices HC$2.50 MF$0.75
Wisconsin Univ., Madison.
THE RADIATION BALANCE OF THE EARTH FROM A SATELLITE.
by F. B. House. 1965, 90p NASA-CR-76422
Contract NASW-65

Descriptors: *Albedo, *Long wave radiation, *Radiation measurement, *Spacecraft sensor, *Tiros iv satellite, Balance, Distribution, Earth, Long, Measurement, Meridional, Radiation, Sensor, Single, Solar, Spacecraft, Stream, System, Terrestrial, Wave.

For abstract, see STAR 04 17.

N66-32106 **Field 8N**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ON THE PROBABLE INFLUENCE OF HIGHER ORDER EARTH GRAVITY IN THE DETERMINATION OF THE EQUATORIAL ELLIPTICITY OF THE EARTH FROM THE DRIFT OF SYNCOM II OVER BRAZIL.
by C. A. Wagner. Aug 66, 25p NASA-TN-D-3314
Revised

Descriptors: *Ellipticity, *Equator, *Gravitational effect, *Synchronous communications (syncom-ii) satellite p, Brazil, Distortion, Drift, Earth, Effect, Field, Geodesy, Gravitational, Satellite.

For abstract, see STAR 04 17.

N66-32251 **Field 8N**
CFSTI Prices HC$4.25 MF$1.75
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
ELECTRODYNAMICS OF THE MAGNETOSPHERE - GEOMAGNETIC STORMS.
by S.-I. Akasofu. May 66, 331p NASA-CR-76676
Grants NSG 233-62, NSG-201-62
Its Rept.-66-19

Descriptors: *Electrodynamics, *Geomagnetic storm, *Magnetosphere, *Solar plasma, Asymmetry, Aurora, Current, Flare, Flow, Geomagnetic, Interaction, Plasma, Polar, Proton, Ring, Shock, Solar, Storm, Surface, Wave, Wind.

For abstract, see STAR 04 17.

N66-37267 **Field 8N**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE EARTH'S LONGITUDE GRAVITY FIELD AS SENSED BY THE DRIFT OF THREE SYNCHRONOUS SATELLITES.
by C. A. Wagner. Oct 66, 111p NASA-TN-D-3557

Descriptors: *Gravitational field, *Synchronous satellite, Drift, Earth, Field, Gravitational, Gravity, Harmonic, Longitude, Satellite, Synchronous, Syncom satellite.

For abstract, see STAR 04 22.

N66-37509 **Field 8N, 4A, 3B**
CFSTI Prices HC$2.00 MF$0.50
Institut D Aeronomie Spatiale De Belgique, Brussels.
THE EARTH'S MAGNETOSPHERE.
De Magnetosfeer Der Aarde
by E. Aerts. 1966, 37p A-44-1966
In Dutch, English, French, Dutch And German Summaries

Descriptors: *Earth atmosphere, *Geomagnetism, *Interplanetary spacecraft, *Magnetosphere, *Solar activity, Corpuscular, Dungeys wind shear mechanism, Field, Heterosphere, Homosphere, Ionization, Magnetic, Magnetopause, Meteorology, Plasma, Radiation, Satellite, Solar, Storm, Wind.

For abstract, see STAR 04 22.

N66-37597 **Field 8N, 16D**
CFSTI Prices HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE MAGNETIC CALIBRATION OF A SKYLARK SOUNDING ROCKET.
by E. A. Anstey. May 66, 43p RAE-TM-SPACE-78

Descriptors: *Calibration, *Magnetometer, *Skylark rocket, Alignment, Attitude, Electronic, Equipment, Facility, Power, Precaution, Procedure, Requirement, Rocket, Site, Sounding, Supply, Test.

For abstract, see STAR 04 22.

9A. COMPONENTS

AD-430 361 **Field 9A**
CFSTI Price: HC$1.60
Polytechnic Inst. of Brooklyn, N. Y.
SINGULAR NETWORK ELEMENTS,
by Herbert J. Carlin. Jan 64, 20p
Contract AF 30 (602)-2868
RADC-TDR-63-511

Descriptors: (*Electrical networks, Theory), Circuits, Linear systems, Electrical impedance, Admittance, Matrix algebra, Numerical analysis, Transformations (Mathematics).

This report considers, from the point of view of linear vector spaces, the limits of behavior of singular network elements. In particular it is shown that the nullator (the linear time invariant uniport with v=i=o) and the norator (the linear time invariant uniport with v and i arbitrary) cannot be derived by a limiting process on a normal network and in this sense is singular. (Author)

AD-452 890 **Field 9A**
CFSTI Price: HC$3.60
Microwave Electronics Corp., Palo Alto, Calif.
DEVELOPMENT OF ELECTRON GUN WITH NON-INTERCEPTING GRIDS.
Quarterly progress rept. no. 5, 28 May-28 Aug 64.
28 Aug 64, 33p
Contract DA-36-039-AMC-02270 (E)
Proj. DA-IP6-22001-A 055-04

Descriptors: (*Electron guns, Electron tube parts), Tests, Cathodes (Electron tubes), Electron beams, Electrostatics, Electrodes, Anodes (Electron tubes), Electron tube heaters, Voltage.

Studies were conducted and tests performed covering the following categories: Operation of the 0.570-inch radius cathode, multi-electrode gun using hexagonal aligned grids in the beam tester showed substantial improvement in the beam profile over previous efforts. Beam diameter of approximately 0.110-inch was obtained. A pair of aligned grids having 0.030-inch square openings and 0.002-inch wire width was non-intercepting when operated with a 0.570-inch spherical radius cathode and a 0.375-inch spherical radius anode. A spherical anode (R = 0.295) was installed in place of the regular anode on the 0.570-inch radius cathode gun using hexagonal mesh aligned grids (83% open). Additional pairs of aligned grids were made. Hexagonal mesh molybdenum grids were shown to be an improvement over square mesh. Cathode heater fields were shown to affect the beam shape by increasing its diameter about 10% as was discussed in Quarterly Report 3. Cathode heater fields were shown to influence grid interception when a spherical anode was spaced 2 to 3 times the optimum (concentric) distance from the cathode. One polarity provided lower grid interception than that obtained from zero heater current operation. (Author)

AD-462 344 **Field 9A**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
THE EFFECT OF SULPHUR ON THE WEAR OF CARBON BRUSHES AND COMMUTATORS IN AVIATION KEROSINE.
by J. K. Lancaster. Feb 65, 14p Technical rept. TR-65013

Descriptors: (*Carbon brushes, Wear resistance), (*Commutators, Wear resistance), Sulfur, Kerosine, Aviationfuels, Copper, Fuel pumps, Electric motors, Sliding contacts, Electrical properties, Great Britain.

The operation of submerged fuel-booster pumps on aircraft involves contact between aviation kerosine and the carbon brushes and commutators of D.C. motors. Laboratory experiments have been made to determine the importance of the sulphur present in the kerosine on the wear and electrical characteristics of a sliding copper-carbon interface. Significant amounts of reactive sulphur can be liberated by dissociation of thiophenes, etc, when arcing occurs. Although this sulphur reacts with copper, its presence does not appear to be detrimental to the electrical properties of the contact. The effect of reactive sulphur on the wear of copper is negligible in comparison to the direct effect of arcing itself on wear. (Author)

AD-464 866 **Field 9A**
CFSTI Price: HC$9.60
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
QUARTZ CRYSTAL AGING EFFECTS.
Interim rept. no. 8, 15 Feb 63-15 Feb 65,
by R. B. Belser, and W. H. Hicklin. 15 Feb 65, 91p
Contract DA-36-039-AMC-02251 (E)
Proj. DA-1P6-22001-A-058-01-07

Descriptors: (*Quartz resonators, Aging (Materials)), Reliability, Visual inspection, X-ray diffraction analysis, Electrical properties, Strain (Mechanics), Radiation effects, Material removal, Manufacturing methods.

Approximately 325 quartz resonators have been fabricated or purchased and measured for aging and reliability at 85C over periods up to 14 months. These have been divided among low frequency (100 to 500 kc), 3 Mc, 10 Mc and 16 Mc resonators and among natural, cultured, and electrolytically swept natural and cultured quartz. Data accumulated by electrical measurements and by visual and x-ray diffraction methods have been analyzed in order to determine mechanisms responsible for the principal aging vectors observed. Measured reliabilities are reported. Of 96 low frequency resonators only 46% passed the initial aging requirements of < 5 ppm during the first 30 days. Three of these failed to subsequent requirement of < 2 ppm each 30 days thereafter giving a reliability of 94% for a 6 month period. Analyses by x-ray diffraction methods revealed strains associated with the quartz blank fabrication and mounting methods. Edge grinding, silver spotting, plating separation by airbrasive, quartz defects, and strained mounts, all appeared as possible contributors to high positive aging rates. (Author)

AD-640 711 **Field 9A, 13I**
CFSTI Prices: HC$6.00 MF$1.25
Weston Instruments, Inc., Archbald, Pa.
PRODUCTION FACILITIES FOR MULTI-TURN METAL-FILM TRIMMER RESISTORS PER SIGNAL CORPS TECHNICAL REQUIREMENT SCS-127 DATED 9 FEBRUARY, 1962 AND MIL-R-22097B (MODIFIED).
Final rept.,
by F. Studer. 19 May 66, 203p
Contract DA-36-039-sc-86734 (E)
See also AD-635 129.

Descriptors: (*Variable resistors, Manufacturing methods), Metal films, Resistance (Electrical), Nickel, Deposition, Films, Wear resistance, Heat treatment.

The development of production facilities for the trimmer revealed unanticipated shortcomings in the film characteristics. A chemically deposited nickel film was found to be inherently better than an evaporated nickel-chromium film. Neither was found to approach the more demanding requirements of trimmer applications as compared to fixed resistor requirements. An extensive program designed to exploit the inherently better chemically deposited nickel failed to show correlations required to develop the film characteristics necessary for trimmer application. The need for additional fundamental research is evident. Production facilities were developed and it was demonstrated that these facilities could produce if it had been possible to control adequately the metallizing and heat treating of the film. These facilities offered the advantage of immediate scale-up in production via multiplicity. (Author)

AD-640 824 **Field 9A, 19A**
CFSTI Prices: HC$2.00 MF$0.50
Naval Weapons Lab., Dahlgren, Va.
FERRITES AS DISSIPATIVE RF ATTENUATORS.
Technical memo.,
by Joseph H. Francis. Sep 66, 35p Rept. no. W-11/66

Descriptors: (*Ferromagnetic materials, Attenuators), Transmission lines, Filters (Electromagnetic wave), Hazards, Ordnance, Radiofrequency interference, Attenuation, Feasibility studies.

Principal-wave transmission line theory is used to investigate the feasibility of utilizing ferrites as dissipative radio frequency attenuators to reduce hazards of electromagnetic radiation to ordnance (HERO). The general characteristics of ferrites and their effect on the performance of a ferrite power attenuator are discussed. Two experimental ferrite-filled transmission-line filters are described; neither device provides the desired power attenuation over the 100 kilocycle per second to one megacycle per second frequency range. A description of two experimental ferrite attenuators which utilize the increased rf resistance of a wire-wound ferrite toroid is given; both devices provide satisfactory power attenuator constructed of miniature solid-tantalum electrolytic capacitors and wire-wound ferrite toroids; the power attenuation of this device exceeds the attenuation objective of 40 db at 100 kilocycles per second and 60 db at one megacycle per second. Although a miniature

all-ferrite dissipative filter with the required attenuation can be constructed, a filter composed of solid-tantalum feed-through capacitors and either ferrites or magnetic conductors is considered to be superior. (Author)

AD-640 894 **Field 9A, 13H, 20L**
CFSTI Prices: HC$2.00 MF$0.50
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
PRODUCTION ENGINEERING MEASURE FOR SILICON PN SWITCHING TRANSISTORS.
Quarterly progress rept. no. 4, 25 Feb-25 May 66,
by Mark Siegel, and Jack Freese. 25 May 66. 32p
I-22
Contract DA-36-039-AMC-06164 (E)
Proj. 26072
See also AD-640 484.

Descriptors: (*Silicon, *Transistors), (*Manufacturing methods, Transistors), (*Semiconductor devices, Switching circuits).

Areas of progress during the quarter were as follows: (1) Incoming material specification change to substrate resistivity of 0.01 to 0.02 ohm/cm and breakdown voltage range of 80 to 100 volts has been approved and specifications issued. (2) New diffusion experiments to test narrower basewidths have been initiated. (3) Evaluation probe limits were adjusted and specifications issued. (4) New 10-mil-mask evaluation has been initiated. (5) A new Motorola photoresist is now under evaluation. (6) The cause of stress failures in environmental testing has been determined and appropriate measures were initiated to eliminate the failure mode. (7) Metallization amounts have been standardized and specifications issued. (8) A new cascade rinse facility is now in production use. (Author)

AD-641 005 **Field 9A**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE PACKAGED AND MOUNTED DIODE AS A MICROWAVE CIRCUIT.
Revised ed.,
by William J. Getsinger. 30 Sep 65, 13p JA-2484
Contract AF 19(628)-5167
ESD-TR-66-228
Revision of manuscript submitted 28 Jun 65.
Availability: Published in IEEE Transactions on Microwave Theory and Techniques vMTT14 n2 p58-69 Feb 1966.

Descriptors: (*Diodes (Semiconductor), Microwave equipment), Microwave frequency, Resonant frequency, Resistance (Electrical), Varactor diodes, Performance (Engineering), Packaged circuits.

Suitable definitions of the elements in the equivalent circuit of a packaged diode yield a lumped-element circuit with an impedance at its terminals which is the same as the total radial-line impedance of the packaged diode with the outer surface of the diode taken as the terminal surface. Consideration of the packaged diode as a radial-line structure permits an analytical justification for the incorporation of the diode circuit with the circuits of waveguide, coaxial-line, and strip-line diode mounts. As a result, the lumped-element equivalent circuit of a packaged diode can be directly related to the microwave equivalent circuit of the diode and the mount together. Diode element values, which were obtained from low-frequency measurements, have been used in conjunction with the theoretically determined circuits of mounted diodes to predict resonant frequencies at X-band of waveguide, coaxial-line, and tripline mounts holding packaged diodes. Similarly, antiresonant frequencies of greater than 20 Gc/s have been predicted for diodes in a radial cavity. The validity of all these predictions has been verified by measurement. (Author)

AD-641 098 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
EIMAC, San Carlos, Calif.
8252W: A RUGGEDIZED VERSION OF THE 8252/4PR60B.
Final development rept.,
by J. W. Kendall, Jr. Oct 66, 38p
Contract NObsr-95166
Proj. SF00102
Task 6255

Descriptors: (*Electron tubes, Reliability (Electronics)), Failure (Electronics), Life expectancy, Environmental tests, Design, Extremely low frequency.

A report is made of the development work done to improve the reliability of the 8252/4PR60B when operated under more severe environmental conditions than are normally encountered.

AD-641 148 **Field 9A, 17A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Applied Science Lab., Brooklyn, N. Y.
COMPLIANT ELECTRIC CABLE FO MINIMUM WIDTH VDS TOWLINES.
Progress rept.,
by Robert J. Forbes, Jr. 24 Oct 66, 17p 9300-54, PR-1
Proj. SF-101-03-20
Task 8366

Descriptors: (*Electric cables, *Towing cables), (*Sonar equipment, Towing cables), Elasticity, Modules (Electronics), Copper.

Compliant electrical conductors are necessary for the successful operation of the minimum width variable depth sonar towline being developed by the Naval Applied Science Laboratory. Experimental samples utilizing a braided copper conductor with an elastomeric core and insulation wall have been manufactured. Investigations have shown that these compliant conductors and conductor modules will withstand the repeated flexing service required of this type of towline. (Author)

AD-641 158 **Field 9A, 20L**
Not available from CFSTI.
Illinois Univ., Urbana. Dept. of Electrical Engineering.
THE EFFECTS OF FIXED BULK CHARGE ON THE CHARACTERISTICS OF METAL-OXIDE-SEMICONDUCTOR TRANSISTORS.
Revised ed.,
by C. T. Sah, and H. C. Pao. 1 Nov 65, 19p
Contract SD-131, Grant AF-AFOSR-714-65
Proj. AF-9763
Task 976302
AFOSR-66-1346
Revision of manuscript submitted 24 Aug 65.
Availability: Published in IEEE Transactions on Electron Devices vED-13 n4 p393-409 Apr 1966.

Descriptors: (*Transistors, Theory), Metals, Oxides, Semiconductors, Doping, Surface properties, Carriers (Semiconductors), Space charges, Voltage.

The theory of the characteristics of the MOS transistors is developed based on a model in which both the bulk charge due to the ionized impurity in the semiconductor substrate and the difference between the electrostatic potential and the voltage drop in the channel are included. A detailed comparison of the theory is made with experimental data of gate capacitance, drain current voltage characteristics, and transconductance characteristic on both N-channel and P-channel silicon devices with thin (2000A) and thick (6200 and 8400 A) oxides under the gate electrode. The correlation is good using the surface mobility as the adjustable parameter. Mobility reduction in the saturation transconductance characteristics is predicted in the theory and demonstrated in the experimental data. It arises entirely from the bulk charge, which modifies the device characteristics, and is not associated with some basic surface scattering phenomena, which further reduce the mobility. It is also demonstrated experimentally that to evaluate a physically meaningful surface mobility from the conductance of the channel, the interface surface state charge Qss cannot be assumed constant in the devices used in this study. (Author)

AD-641 164 **Field 9A, 18H**
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Baltimore, Md.
RADIATION EFFECTS ON INSULATED GATE FIELD EFFECT (MOS) INTEGRATED CIRCUITS.
Quarterly rept. no. 4, 1 Apr-30 Jun 66,
by David M. Long. Oct 66, 90p MND-3264-4
Contract DA-28-043-AMC-01520 (E)
Proj. DA-5900-21-830-44-00
ECOM-01520-4
See also AD-635 198.

Descriptors: (*Integrated circuits, *Radiation damage), Metals, Oxides, Semiconductors, Transistors, Microminiaturization (Electronics), Ionization, Leakage (Electrical), Electric currents.

The report covers the fourth quarter's effort of a program to determine the mechanism and extent of the transient and permanent effects of nuclear radiation on insulated gate field effect (MOS) integrated circuits. The report discusses the results of the past year's investigation of transient response phenomena in custom-built and commercial MOS transistors and commercial MOS integrated circuits. The primary conclusions from the study are indicated below. The transient gate current produced in MOS transistors by a pulse of ionizing radiation is composed of two major components: (1) current leakage from the gate lead to the package through the ionized encapsulated gas, and (2) photovoltaic displacement current resulting from the motion of induced carriers in the tranverse electric field beneath the gate oxide. Both mechanisms produce larger response for n-depletion transistors than for p-enhancement transistors. Mechanisms of generally lesser importance are: photocurrents of protective gate diodes, gate-drain interaction leakage currents, and variations in gate current due to irradiation history. Charge scattering from the device leads is small, and ionization induced leakage through the gate oxide is negligible. (Author)

AD-641 172 **Field 9A, 14D**
CFSTI Prices: HC$6.00 MF$1.25
Melpar, Inc., Falls Church, Va.
TROPICAL SERVICE LIFE OF ELECTRONIC PARTS AND MATERIALS.
Final rept. 1 Jun 65-31 May 66,
by Benjamin H. Dennison, and Walter B. Morrow. Oct 66, 177p
Contract DA-28-043-AMC-01346 (E)
Proj. DA-1P6-22001-A-057
ECOM-01346-F
Continuation of Contract DA-36-039-AMC-02241 (E).

Descriptors: (*Electronic equipment, Life expectancy), Reliability (Electronics), Tropical regions, Tropical deterioration, Resistors, Capacitors, Corrosion, Microminiaturization (Electronics), Modules (Electronics), Tropical tests, Failure (Electronics).

A report is made of an effort to evaluate the degree and extent of degradation of selected electronic components in tropical environments over an extended period of time. The components are the type commonly employed in the fabrication of equipment designed for tactical use by the armed services. The component complement consists of units with industry and service acceptance of over a dozen years as well as recent additions resulting from the pressure and trend toward microminiaturization.

N66-30031 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Laboratoire De Physique Theorique Et Des Hautes Energies, Orsay (France).
SOME REMARKS ABOUT COVARIANCE AND EQUAL TIME COMMUTATORS OF QUARK CURRENTS.

by L. P. Loubaton, and G. Mennessier. May 66, 16p TH/148

Descriptors: *Commutators, Covariance, Component, Current, Derivation, Equal, Physics, Rule, Sum, Theoretical, Time.

For abstract, see STAR 04 17.

N66-30611 **Field 9A**
CFSTI Prices HC$3.00 MF$0.50
Auburn Research Foundation, Inc., Ala.
A STUDY OF QUADRATURE BENDING MODE SIGNAL CANCELLATION BY THE USE OF RC COMMUTATED NETWORKS.
by C. L. Phillips. 21 Apr 66, 60p NASA-CR-76227
Contract NAS8-11116

Descriptors: *Rc network, *Steady state, *Time response, Blend, Cancellation, Commutation, Component, Expression, Gyro, Input, Modification, Network, Phase, Rate, Response, Signal, Sinusoid, State, Steady, Time.

For abstract, see STAR 04 17.

N66-30853 **Field 9A**
CFSTI Prices HC$3.00 MF$0.50
Auburn Research Foundation, Inc., Ala. Radio Frequency Tracking Lab.
A COMPARATIVE STUDY OF THE BALANCED AND SINGLE-ENDED MIXERS IN THE PRESENCE OF LOCAL- OSCILLATOR NOISE TECHNICAL REPORT NO. 7.
by H. M. Summer. 30 Oct 64, 51p NASA-CR-76359
Contract NAS8-5231

Descriptors: *Mixer, *Noise reduction, *Oscillator, Balance, Comparison, End, Local, Modulation, Noise, Output, Reduction, Signal, Simulation, Single.

For abstract, see STAR 04 17.

N66-30854 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Auburn Research Foundation, Inc., Ala. Radio Frequency Tracking Lab.
THE DEGRADATION OF SIGNAL-TO-NOISE RATIOS IN A CRYSTAL MIXER TECHNICAL REPORT NO. 6.
by H. M. Summer. 20 Aug 64, 17p NASA-CR-76360
Contract NAS8-5231

Descriptors: *Degradation, *Diode, *Mixer, *Signal to noise ratio, Crystal, Input, Measurement, Microwave, Noise, Ratio, Receiver, Reduction, Signal-to-noise, Technique, Vacuum.

For abstract, see STAR 04 17.

N66-31669 **Field 9A**
CFSTI Prices HC$3.00 MF$0.75
Martin Co., Baltimore, Md.
EFFECTS OF ELECTRON RADIATION ON UNIJUNCTION TRANSISTORS.
by H. L. Flescher, and E. A. Szymkowiak. Jul 66, 64p NASA-CR-526
Contract NAS5-3734

Descriptors: *Electron radiation, *Junction transistor, *Radiation effect, *Terminal, Analysis, Characteristics, Current, Data, Device, Dosimetry, Effect, Electron, Emitter, Junction, Measurement, Radiation, Testing, Transistor, Voltage.

For abstract, see STAR 04 17.

N66-31927 **Field 9A**
CFSTI Prices HC$3.00 MF$0.75
Itt Federal Labs., Nutley, N. J. Electron Tube Lab.
MILLIMETER-WAVE CONVERTER STUDIES FINAL REPORT, 14 MAY 1962 - 15 JAN. 1963.
by R. C. Wertman, and R. W. Wilmarth. 1963, 110p NASA-CR-76486
Contract NASW-430

Descriptors: *Backward wave, *Converter, *Electron beam, *Millimeter wave, Backward, Ballistics, Beam, Electron, Electronic, Fabrication, Feasibility, Low frequency, Low noise, Millimeter, Noise, Operation, Slow, Structure, Tube, Tune, Wave, Wideband.

For abstract, see STAR 04 17.

N66-32124 **Field 9A**
CFSTI Prices HC$3.00 MF$1.00
Westinghouse Electric Corp., Huntsville, Ala.
DESIGN, DEVELOP, FABRICATE AND DELIVER SILICON POWER TRANSISTORS FINAL REPORT, JUN. 1963 - OCT. 1965.
1965, 123p NASA-CR-76603
Contract NAS8-5335

Descriptors: *Electric property, *Epitaxial deposition, *Silicon transistor, Colector, Deposition, Design, Electric, Emitter, Encapsulation, Epitaxy, Fabrication, Growth, Power, Property, Relay, Semiconductor, Silicon, Slice, Soldering, Switching, Testing, Transistor, Vibration, Voltage.

For abstract, see STAR 04 17.

N66-32131 **Field 9A**
CFSTI Prices HC$3.75 MF$1.25
Philco Corp., Lansdale, Pa.
DESIGN, DEVELOPMENT, FABRICATION, AND DELIVERY OF IMPROVED MOS TRANSISTORS FINAL REPORT, 21 MAY 1965 - 21 MAY 1966.
by E. S. Schlegel. Jun 66, 234p NASA-CR-76639
Contract NAS8-11926

Descriptors: *Gamma radiation, *Instability, *Metal oxide semiconductor (mos), *Threshold current, *Transistor, Alkali, Current, Gamma, Metal, Nickel, Oxide, Plating, Power, Radiation, Semiconductor, Threshold, Tritium, Vapor, Wafer.

For abstract, see STAR 04 17.

N66-32282 **Field 9A**
CFSTI Prices HC$2.50 MF$0.75
Watkins-johnson Co., Palo Alto, Calif.
THE DESIGN AND PERFORMANCE OF A HIGH EFFICIENCY TRAVELING-WAVE TUBE, THE WJ-274 FINAL REPORT, PHASE I.
by L. A. Roberts. 1962, 78p NASA-CR-66147
Contract NAS1-3766

Descriptors: *Spacecraft communications system, *Telemetry, *Traveling wave tube, Characteristics, Communications, Current, Design, Gain, Heater, High efficiency, Output, Performance, Power, Spacecraft, System, Travel, Tube, Voltage, Wave.

For abstract, see STAR 04 17.

N66-32672 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Electra Mfg. Co., Independence, Kans.
ACCELERATION FACTOR DETERMINATION FOR METAL FILM RESISTORS QUARTERLY PROGRESS REPORT NO. 2.
by G. A. Swartz. 15 Jan 66, 41p NASA-CR-76849
Contract NAS8-11076

Descriptors: *Acceleration, *Metal film, *Resistor, Burn, Cycle, Film, Infrared, Initial, Life, Load, Measurement, Metal, Noise, Screen, Temperature, Test.

For abstract, see STAR 04 17.

N66-37211 **Field 9A**
CFSTI Prices HC$6.00 MF$1.50
Massachusetts Inst. Of Tech., Cambridge. Electronic Systems Lab.
GATED AMPLIFIERS FOR DATA PROCESSING IN SPACE.
by J. K. Roberge. Sep 66, 240p NASA-CR-78128, ESL-R-279
Grant NSG-234-61

Descriptors: *Data processing, *Electronic amplifier, Amplifier, Analog, Circuit, Converter, Data, Digital, Divider, Electronic, Gate, Integral, Logic, Multiplier, Performance, Processing, Space, Switching.

For abstract, see STAR 04 22.

N66-37221 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Autonetics, Downey, Calif.
PROCESS TECHNIQUES STUDY OF INTEGRATED CIRCUITS QUARTERLY REPORT NO. 3.
by J. E. Meinhard. 15 Feb 66, 26p NASA-CR-78253
Contract NAS12-4

Descriptors: *Circuit reliability, *Integrated circuit, *Semiconductor device, Ambient, Chromatography, Circuit, Damage, Defect, Device, Dielectric, Effect, Etching, Gas, Integration, Inversion, Isotope, Mass, Oxide, Processing, Radioactivity, Reliability, Semiconductor, Spectrometry, Technique, Tool, Tracer, Transistor.

For abstract, see STAR 04 22.

N66-37222 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Autonetics, Downey, Calif.
PROCESS TECHNIQUES STUDY OF INTEGRATED CIRCUITS QUARTERLY REPORT NO. 4.
by J. E. Meinhard. 15 May 66, 32p NASA-CR-78254
Contract NAS12-4

Descriptors: *Circuit reliability, *Integrated circuit, *Semiconductor device, Ambient, Analysis, Circuit, Crystal, Damage, Defect, Detection, Device, Dielectric, Effect, Etching, Film, Gas, High temperature, Hydrogen, Integration, Inversion, Oxide, Processing, Recovery, Reliability, Semiconductor, Silicon, Technique, Tool, Transistor, X-ray.

For abstract, see STAR 04 22.

N66-37224 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Rochester Univ., N. Y. Inst. Of Optics.
PROPERTIES OF MULTILAYER FILTERS INTERIM REPORT, 1 SEP. 1965 - 28 FEB. 1966.
by P. W. Baumeister. 1966, 29p NASA-CR-78144
Grant NSG-308-63

Descriptors: *Aluminum, *Shutter, *Solenoid, *Ultraviolet filter, Actuation, Bandpass, Calibration, Circuit, Contour, Design, Dielectric, Filter, Firing, Metal, Multilayer, Property, Rapid, Transmission, Ultraviolet.

For abstract, see STAR 04 22.

N66-37312 **Field 9A**
CFSTI Prices HC$5.00 MF$1.00
Hughes Aircraft Co., Newport Beach, Calif. Solid State Research Center.
DEVELOPMENT OF A THIN-FILM SPACE-CHARGE- LIMITED TRIODE FINAL REPORT, MAR. 1965 - JUN. 1966.
by P. Knoll, and R. Zuleeg. Jun 66, 171p NASA-CR-78149
Contract NAS12-5

Descriptors: *Space charge, *Thin film, *Triode, Arsenide, Cadmium, Device, Frequency, Gallium, Limit, Semiconductor, Sulfide, Temperature, Transistor.

For abstract, see STAR 04 22.

N66-37314 **Field 9A**
CFSTI Prices HC$4.00 MF$1.00
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. Of Electrical Engineering.
STUDY IN OPTIMIZATION OF MICROCIRCUIT DESIGN FINAL REPORT.
by D. N. Arden, S. K. Ghandhi, E. Henry, F. L. Thiel, and R. Wooley. 1 Jul 66, 149p NASA-CR-78049
Contract NAS12-34

Descriptors: Circuit reliability, *Microcircuit, *Optimization, Asynchronous, Circuit, Electric, Equipment, Hazard, Immunity, Logic, Nickel, Noise, Oscillation, Pulse, Silicon.

For abstract, see STAR 04 22.

N66-37359 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Bourns, Inc., Riverside, Calif.
DESIGN, DEVELOPMENT AND FABRICATION OF AN ABSOLUTE-TYPE PRESSURE SWITCH FINAL TECHNICAL REPORT, 1 JUL. 1965 - 30 JUN. 1966.
by K. W. Clark. 30 Jul 66, 23p NASA-CR-78169, N-471-12
Contract NAS8-20501

Descriptors: *Pressure measurement, *Switch, *Vibration, Actuation, Calibration, Design, Fabrication, Flat, Measurement, Module, Operation, Performance, Pressure, Prototype, Spring, Temperature.

For abstract, see STAR 04 22.

N66-37363 **Field 9A**
CFSTI Prices HC$3.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
RESEARCH ON COLD CATHODES FINAL REPORT.
by B. V. Dore, and D. V. Geppert. May 66, 57p NASA-CR-78261
Contract NAS5-9581

Descriptors: *Cold cathode, *Hot electron, *Metal surface, *Semiconductor, Barium, Barrier, Cathode, Cold, Emitter, Field, Film, Gallium, Metal, Oxide, Phosphorus, Research, Surface, Thin, Transverse.

For abstract, see STAR 04 22.

N66-37545 **Field 9A**
CFSTI Prices HC$3.00 MF$0.50
Bendix Corp., Southfield, Mich. Research Laboratories Div.
STUDY TO INVESTIGATE THE EFFECTS OF IONIZING RADIATION ON TRANSISTOR SURFACES FOURTH QUARTERLY REPORT, PERIOD ENDING JUN. 30, 1966.
by D. L. Nelson, and R. J. Sweet. 15 Jul 66, 54p NASA-CR-78352
Contract NAS8-20135
Its Rept.-3557

Descriptors: *Ionizing radiation, *Surface erosion, *Transistor, Ambient, Bias, Effect, Electronics, Environment, Junction, Nitrogen, Semiconductor, Temperature, Vacuum.

For abstract, see STAR 04 22.

PB-173 338 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Reclamation, Denver, Colo. Electric Power Branch.
REACTOR SWITCHING TESTS OF AN OIL CIRCUIT BREAKER SHIPROCK SUBSTATION COLORADO RIVER STORAGE PROJECT FEBRUARY 16-17, 1966,
by G. W. Cleaveland, and R. R. Fillenberg. 3 Aug 66, 64p EP-17

Descriptors: (*Electrical switches, Tests), (*Circuit breakers, Tests), Electrical engineering, Performance (Engineering), Switching circuits, Capacitors, Resistors, Electric arcs, Oils, Oscilloscopes, Oscillographs, Voltage dividers, Current limiters.

Reactor switching characteristics of a 13.8-kv oil circuit breaker were investigated by a series of controlled point-on-cycle switching tests. Long clearing times (2.54 cycles on the average) result from high rates of rise of recovery voltage and from current chopping overvoltages. Laboratory model reactor switching tests demonstrated that breaker contact recovery voltages of 3.0 per unit for the first contact to clear and 3.46 per unit shared by the last two contacts clearing are to be expected, and that the application of suitable resistor-capacitor transient suppressors would be effective in reducing both the magnitude and rate of rise of recovery voltages. The effectiveness of the application of these transient suppressors was demonstrated during the field tests where clearing times were reduced to 1.65 cycles on the average (clearing achieved about two current zeros earlier than clearing without transient suppressors). A considerable reduction of oil carbonization and contact erosion is to be expected because of the reduced arc time and reduced total arcing period energy. The capacitor-resistor loading equipment on the reactor side of the tested breaker is to be continued in service for about a year to provide information for further evaluation in comparison to a similar breaker on an unmodified circuit. (Author)

AD-467 952 **See Field 15E**

AD-640 584 **See Field 9E**

AD-640 585 **See Field 20L**

AD-640 933 **See Field 9E**

AD-640 968 **See Field 10B**

AD-641 002 **See Field 14B**

AD-641 198 **See Field 20B**

AD-641 250 **See Field 9E**

AD-641 253 **See Field 9E**

AD-641 301 **See Field 18D**

9B. COMPUTERS

AD-451 862 **Field 9B**
CFSTI Price: HC$2.60
System Development Corp., Santa Monica, Calif.
COMMAND RESEARCH LABORATORY: INTRODUCTION TO THE TIME-SHARING SYSTEM.
Professional paper,
by Jules I. Schwartz. 14 Sep 54, 25p SP-1722/000/00

Descriptors: (*Programming (Computers), Time), Computer logic, Control systems.

This document describes Time-Sharing System (TSS) in terms of its properties, services and potential. It reports that the results of the first year's use of the Time-Sharing System have been encouraging, and that the actual development of the system proceeded in four stages: Design and Checkout of the Initial System, Initial Use of the System, Full-Scale Use of the System, and The Future. It concludes that emphasis will be in areas that will stress significant improvement in the techniques and tools available to the user. (Author)

AD-640 538 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. Stanford Electronics Lab.
EFFECTS OF ADAPTATION PARAMETERS ON CONVERGENCE TIME AND TOLERANCE FOR ADAPTIVE THRESHOLD ELEMENTS.
Revised ed.,
by C. Hugh Mays. 10 Feb 64, 4p
Contract AF 33 (616)-7726
Revision of manuscript submitted 3 Sep 63. NSF Scientific Documentation Project.

Descriptors: (*Learning machines, Design), Adaptive systems.

AD-640 556 **Field 9B**
CFSTI Prices: HC$1.60 MF$0.50
Ballistics Research Lab., Aberdeen Proving Ground, Md.
PLANNING UNIVERSAL SEMI-AUTOMATIC CODING,
by Saul Gorn. May 54, 11p
Symposium on Automatic Programming for Digital Computers, Navy Mathematical Computing Advisory Panel, 13-14 May 1954, p74-83. NSF Scientific Documentation Project.

Descriptors: (*Programming (Computers), Standardization), (*Digital computers, Coding), Automatic, Computer logic, Compilers, Flow charting.

Universal coding for computers is sought that uses relative addresses and a pseudocode and that assembles and translates, printing out a directory of final addresses of key commands, variables, and constants. The machines must be able to store commands with other words, transfer logic out of sequence, and make decisions. They should be able also to make such elementary commands as adding, multiplying, subtracting, extracting a digit, taking absolute values, taking negatives, shifting digits, and generally transferring information from one place to another.

AD-640 590 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
SPAN REFERENCE MANUAL: SPAN DATA-TRANSFORMATIONS AND STRATIFICATION CAPABILITY.
Technical memo.,
by V. V. Almendinger. 29 Jul 66, 46p TM-1563/014/03
Contract CPR-11-1543

Descriptors: (*Data processing systems, Specifications), (*Urban areas, Statistical analysis), Selection, Multivariate analysis.

Identifiers: SPAN (Statistical processing and analysis).

The document is one of a series of volumes of the SPAN Reference Manual describing the SPAN system for data management and statistical analysis. The SPAN system provides an integrated file processing and multivariate analysis capability for problems involving large data matrices with large numbers of variables. The system is oriented to problems of social science in general and urban data analysis in particular. The volume describes the specification and use of SPAN capabilities for the transformation of the contents of a data file in the course of its input to a SPAN process. The data-transformation capability allows the user to state algorithmic procedures leading to the generation of new data variables as transformations of the source data. The entity stratification capability provides for the classification and selection of entity records according to user-specified criteria. (Author)

AD-640 591 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.

INFORMATION PROCESSING POTENTIALS IN LARGE-SCALE OPERATIONS.
Summary rept., Oct 62-Jun 66,
by Beatrice K. Rome, and Sydney C. Rome. 18 Jul 66, 42p TM-1128/100/00
Contract AF 19 (628)-5166

Descriptors: (*Data processing systems, Computers), Systems engineering, Management control systems, Simulation, Coding.

In the study of large organizations, the information, communication, and governing processes have been extremely difficult to formulate. Towards such a formulation, the strategy of the Leviathan studies has been to pursue two lines of attack--theoretical formalization and computer-based simulation. By these means, Leviathan research has studied the interrelationships between (1) executive policy making and control and (2) system performance of large organizations, within (3) experimentally controlled laboratory environments. In answer to the challenge of markedly enhanced computer capabilities just now being made available, practical and theoretical advances have been made in formalizing the communication and governing process in large organizations. These advanced formulations and their significance are explained. (Author)

AD-640 599 **Field 9B, 12A**
CFSTI Prices: HC$6.60 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
DIFFERENTIAL ANALYZER-ELECTRICAL ASPECTS OF OPERATION,
by Jeremiah Lynch. Dec 47, 66p Rept. no. 654
Proj. TB3-0007

Descriptors: (*Analog computers, Electrical equipment), Operation, Integrators (Computers), Differential equations, Electric motors, Amplifiers.

I. GENERAL DESCRIPTION OF ELECTRICAL COMPONENTS OF ANALYZER (a device for mechanically solving ordinary differential equations): Integrators and associated circuits, tables and associated circuits, independent-variable motor and its controls, printer, and auxiliary units. II. EXPLANATION OF CIRCUIT DIAGRAMS: Balancer control circuit, circuits connecting the balancer control and amplidyne cabinets to the machine, connections at integrator and table junction boxes, amplifier and associated circuits, independent-variable control panel, printer circuits, and safety devices. III. PROCEDURES TO BE FOLLOWED BY THE OPERATORS IN OPERATION AND REPAIR. IV. TROUBLE SHOOTING ON AMPLIFIERS.

AD-640 648 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
SECURITY IN THE COMPUTER ENVIRONMENT.
Professional paper,
by Robert L. Dennis. 18 Aug 66, 34p SP-2440/000/01
Contract AF 19 (628)-5166
A summary of the Quarterly Seminar, Research Security Administrators - June 17, 1965, Santa Monica, Calif.

Descriptors: (*Computers, Symposia), Data processing systems, Data storage systems, Electromagnetic waves.

Identifiers: Time sharing (Computers).

AD-640 655 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
COMPUTER SOFTWARE: DEVELOPMENTS AND RECENT TRENDS IN PROGRAMMING AND OPERATING SYSTEMS.
Professional paper,
by Christopher J. Shaw. 26 Aug 66, 18p SP-2582/000/00
Presented at a seminar for the EDP Committee of the League of California Cities, at the System Development Corp., Santa Monics, Calif., 26 Aug 66.

Descriptors: (*Programming (Computers), Operation), Programming languages, Data processing systems, Information retrieval, Computers, Computer personnel.

The report briefly defines such concepts as: Computer software, programming and operating system functions, programming languages and processors, machine independence, procedurality, generality, interpreters, translators, assemblers, compilers, and generators. It discusses, in relatively non-technical terms, major developments in operating systems, and outlines the kind of interactive programming system that could shortly result from these trends. (Author)

AD-640 706 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
PROBABILITY MODELS FOR MULTIPROGRAMMING COMPUTER SYSTEMS.
Management Sciences research rept.,
by D. P. Gaver Jr. Sep 66, 39p MSRR-84
Contract Nonr-760 (24)
Proj. NR-047-048

Descriptors: (*Compilers, *Models (Simulations)), (*Probability, Programming (Computers)), Input-output devices.

A probability model is developed for a computer system that is capable of multi programming, i.e., that maintains several program segments simultaneously in Main Memory (core), the latter being served by several input-output channels. Under various probabilistic assumptions, reflecting the mixture of jobs submitted to the system, the productivity of systems of various configurations is studied. (Author)

AD-640 758 **Field 9B, 12A**
Not available from CFSTI.
Hebrew Univ., Jerusalem (Israel).
HOMOMORPHISMS BETWEEN FINITE AUTOMATA,
by Azaria Paz. 8 Nov 61, 8p
Contract N-62558-2214
Availability: Published in The Bulletin of the Research Council of Israel v10F n3 p93-100 Apr 1962.

Descriptors: (*Automata, *Mapping (Transformations)), Mathematical logic, Israel.

Identifiers: Homomorphisms.

In this paper the author proves that the number of states of a finite automation can be reduced to three without increasing the number of states (or even to two by increasing it) by building a reduced homomorphic automation which is able to imitate the given automation in a sense described in the text. Moreover a finite automation is specified which is universal for a class of finite automata with a bounded number of states. The third part of the paper proves that the number of states of a finite automation cannot, in general, be reduced at all. (Author)

AD-640 798 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Rome Air Development Center, Griffiss AFB, N. Y.
INTERPROGRAM COMMUNICATIONS, PROGRAM STRING STRUCTURES, AND BUFFER FILES.
Final technical rept.,
by E. Morenoff, and J. B. McLean. Oct 66, 27p
RADC-TR-66-580
Proj. DW-64-31C

Descriptors: (*Programming (Computers, Design), (*Data processing systems, Programming (Computers)), Scheduling, Monitors, Computers.

The basic features of Program String Structures are reviewed in the context of their employment in the generation and modernization of large programming systems. The principles of operation of the Buffer File, the fundamental element of the Program String Structure are described. The implications of the application of Buffer Files outside the framework of the Program String Structure are examined in terms of their unique characteristics. The Buffer File mode of operation provides a generic method for effecting both intra-computer and inter-computer program communication. It can be used for the passage of streams of data from one program to another, as well as for the passage of the more static program state type data. The Buffer File mode of operation may be used to synchronize the execution of otherwise asynchronously running programs and as a basic scheduling and resource allocation mechanism of the computer monitor system. (Author)

AD-640 822 **Field 9**
CFSTI Prices: HC$2.00 MF$0.50
Syracuse Univ. Research Inst., N. Y.
NETWORK SYNTHESIS OF CASCADED THRESHOLD ELEMENTS.
Interim technical rept., Sep 64-Sep 65,
by W. S. Bennett Jr. Sep 66, 45p
Contract AF 30 (602)-3197
Proj. AF-5581
Task 558104
RADC-TR-66-518

Descriptors: (*Computer logic, Switching circuits), (*Switching circuits, Synthesis), Networks, Set theory, Algebra.

Identifiers: Threshold devices.

A threshold function is a switching function which can be simulated by a single, simplified, idealized neuron, or threshold element. In this report, threshold functions are examined in the context of abstract set theory and linear algebra for the purpose of obtaining practical synthesis procedures for networks of threshold elements. A procedure is described by which, for any given switching function, a cascade network of these elements can be specified with which to simulate the given function. The techniques employed appear to be of potential value for the synthesis of more general network configurations. (Author)

AD-640 989 **Field 9**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
AUGMENTING HUMAN INTELLECT: EXPERIMENTS, CONCEPTS, AND POSSIBILITIES.
Summary rept.,
by D. C. Engelbart. Mar 65, 72p
Contract AF 49 (638)-1024
Proj. SRI-3578

Descriptors: (*Input-output devices, Instrumentation), (*Man-machine systems, Computers), Typewriters, Punched tape, Programming (Computers), Data transmission systems.

Identifiers: Flexowriters.

Early stages of research on augmenting human intellect are reported. An experimental system comprising a tapewriter (tape-punching typewriter), a computer-programmed Translator, and a Flexowriter and incorporating a text-editing facility has been implemented and was used in composing much of the original rough draft of the report. The Z-code system that provides the editing operations is described. The general philosophy of the system is described, and then an illustration is given in which the philosophy is applied to a particular problem. A chord handset is discussed that will permit one or two-handed binary transmission.

and possible results of its incorporation into the system are mentioned. Questions still to be answered and speculations about possible future results are included. (Author)

AD-641 037 **Field 9B, 9D**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Electrical Engineering.
IMPROVING RELIABILITY OF A SEQUENTIAL MACHINE BY ERROR-CORRECTING STATE ASSIGNMENTS.
Revised ed.,
by H. Frank, and S. S. Yau. 24 Jun 65, 3p
Grant AF-AFOSR-98-65
AFOSR-66-1221
Revision of manuscript received 9 Aug 64.
Availability: Published in IEEE Transactions vEC-15 n1 p111-3 Feb 1966.

Descriptors: (*Automata, Reliability), (*Coding, Automata), Information theory, Corrections.

Identifiers: Error-correcting codes, Sequential machines.

AD-641 052 **Field 9B, 9E**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Electrical Engineering.
ON THE SERIES-TO-PARALLEL TRANSFORMATION OF LINEAR SEQUENTIAL CIRCUITS.
Revised ed.,
by Arthur Gill. 19 Oct 65, 4p
Grant AF-AFOSR-639-65
Proj. AF-9749
Task 974901
AFOSR-66-1210
Revision of manuscript submitted 25 Jun 65.
Availability: Published in IEEE Transactions on Electronic Computers vE-15 n1 p107-8 Feb 1966.

Descriptors: (*Switching circuits, Transformations), Feedback, Linear systems, Sequences, Computer logic.

In a recent paper, Hsiao and Sih proposed a method for transforming binary linear feedback shift registers (initially cleared) into a binary linear circuit with f input terminals and f output terminals which operates f times faster. In this manner, the availability of f channels, rather than one, can be exploited to process (and, in particular, encode and decode) data at a rate proportional to f. In this paper, a method of transformation is formulated which is applicable to arbitrary linear sequential circuits defined over an arbitrary modular field and subject to an arbitrary initial state. (Author)

AD-641 118 **Field 9B, 14D**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
ON THE CONNECTION ASSIGNMENT PROBLEM OF DIAGNOSABLE SYSTEMS,
by F. P. Preparata, G. Metze, and R. T. Chien.
Oct 66, 29p Rept. no. R-322
Contract DA-28-043-AMC-00073 (E), Grant NSF-GK-690
Proj. DA-20014501B31F
Supported in part by grant NSFGK-36.

Descriptors: (*Digital systems, Test methods), Reliability (Electronics), Scheduling, Graphics, Model theory.

Identifiers: Fault location.

The paper treats the problem of automatic fault diagnosis for systems with multiple faults. The system is decomposed into a number of units u sub 1, u sub 2..., sub n, where a unit is a well identifiable portion of the system which cannot be further decomposed for the purpose of diagnosis. By means of a given arrangement of testing links (connection assignment) each unit of the system tests a subset of units, and a proper diagnosis can be arrived at for any diagnosable fault pattern. Methods for optimal assignments are given for instantaneous and sequential diagnosis procedures. (Author)

AD-641 169 **Field 9B, 5A**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
SOME FACTORS IN PLANNING FOR FUTURE MILITARY DATA AUTOMATION SYSTEMS,
by G. M. Northrop. Oct 66, 21p P-3428
Prepared for presentation at the Congress on Information System Science and Technology (3rd) Buck Hill Falls, Pennsylvania, November 20-23, 1966.

Descriptors: (*Data processing systems, Armed forces (United States)), Computers, Automation, Management planning.

Some future trends of military data processing are delineated, and some of the potential effects that master planning and the coordination of master plans might have on these trends are indicated. The functional uses of data processing by the military are categorized; the relative scope of data automation activities by the services are outlined; a few of the dichotomies facing master planners are discussed; some of the potential bottlenecks that may slow the desired progress of data automation improvement are listed; and, some summarized suggestions of future planning efforts are presented.

AD-641 194 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Western Management Science Inst., Univ. of California, Los Angeles.
A FORTRAN IV GENERAL - PURPOSE DEDUCTIVE PROGRAM,
by J. R. Quinlan. Aug 66, 47p WMSI Working Paper-106
Contract Nonr-233 (75)
Proj. NR-047-041

Descriptors: (*Programming (Computers), *Mathematical logic), Programming languages, Problem solving, Theorems.

Identifiers: FORTRAN.

A deductive program (written in FORTRAN IV) which has solved problems of several different types without reprogramming is introduced. A set of general heuristics which have been found suitable for many kinds of problems is constructed. Some examples of output are given in an appendix. (Author)

AD-641 196 **Field 9B, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Western Management Science Inst., Univ. of California, Los Angeles.
THE APPLICATION OF A NONLINEAR PROGRAMMING ALGORITHM TO A SECOND ORDER REPRESENTATION OF THE PROBLEM,
by G. W. Graves, and A. B. Whinston. Sep 66, 23p WMSI Working Paper-108
Contract Nonr-233 (75)
Proj. NR-047-041

Descriptors: (*Algorithms, *Nonlinear programming), Problem solving, Programming (Computers).

Recently several algorithms have been presented for the solution of nonlinear programming problems. Examples of such work are the procedures of Rosen, Zoutendijk, Fiacco and McCormick, and Graves. In contrast to the amount of theoretical activity, relatively little work has been published on the computational aspects of the algorithms. This paper describes some computational experiments in the area of nonlinear programming. Specifically, working within the framework of an algorithm developed by G. Graves, the authors shall compare the convergence using only first derivatives with the convergence obtained when the algorithm is applied to an expanded natural second order form of the problem requiring second derivatives. First they provide a general description of the nonlinear algorithm with a proof of convergence. Next they give a natural second order form of the problem. Finally, the computational results for four nonlinear problems recently circulated by A. R. Colville of I.B.M. are presented. (Author)

AD-641 205 **Field 9B, 5B**
CFSTI Prices: HC$3.00 MF$0.75
Northwestern Univ., Evanston, Ill. Information-Processing and Control Systems Lab.
ASSOCIATIVE MEMORY SYSTEMS AND THEIR APPLICATIONS TO PICTURE AND ARITHMETIC PROCESSES.
Technical rept.,
by Chao-Chih Yang. Aug 66, 86p TR-66-103
Contract N00014-66-C0020-A03, Grant AF-AFOSR-98-65
Proj. NR-373-502

Descriptors: (*Computer storage devices, Operation), Pattern recognition, Cryogenic storage devices, Information retrieval, Mathematics.

Two different associative memory systems implemented by cryotrons and cutpoint cells are presented. The cutpoint cellular associative memory designed on the basis of stage delay analysis does not use any ladder structure, but employs a high-speed controlled shift register for the sequential tagging of all matched memory words. Both systems are so mechanized that their structures are simple and especially compatible with the batch fabrication of integrated circuits. Moreover, both systems can perform ordered information retrieval following Lewis's sorting scheme, template-matching pattern recognition based on the union-intersection concept and nonbulk two-summand additions of signed binary numbers in the signed-2's-complement number system. The basic operations of each system include comparison, reading, writing, sensing and output-summing processes being all performed on the basis of parallel-by-bit. During simultaneous comparison, a bit-position corresponding to all bit-memories of equal significance can be masked out. The processing system for arithmetic operations consists of an associative memory, right shift registers and Mealy type sequential machines. (Author)

AD-641 252 **Field 9B, 6D**
CFSTI Prices: HC$3.00 MF$0.50
RAND Corp., Santa Monica, Calif.
REAL-TIME RECOGNITION OF HANDPRINTED TEXT,
by Gabriel F. Groner. Oct 66, 55p RM-5016-ARPA
Contracts SD-79, ARPA-Order-189-1

Descriptors: (*Character recognition, *Input-output devices), (*Printing, Character recognition), Real time, Computers.

The report describes a scheme which permits an on-line computer user to print text naturally, and have it recognized accurately. This scheme, which recognizes 53 symbols, enables a user to communicate data and directives to a computer by using only a RAND tablet with its pen as an input device. The tablet provides high resolution point-by-point pen location data which the recognition scheme analyzes as a symbol is being drawn. This analysis describes a handprinted symbol primarily as a time sequence of features. Identification is based on a data-dependent sequence of tests. Symbols are separated from one another according to their identifications and relative positions. The scheme is evaluated by determining how accurately it recognizes isolated symbols, and how much time users need to compose computer code online. (Author)

NAA-SR-11943 **Field 9, 13I**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
AN ANALOG COMPUTER STUDY OF THE DYNAMICS OF THE MRP COMBINED ROTATING UNIT SHAFT-BEARING SYSTEM,
by J. H. Bick, and A. G. Presson. 15 Jul 66, 76p
Contract AT (11-1)-GEN-8

Descriptors: (*Analog computers, Shafts), (*Shafts, Mathematical models).

For abstract, see NSA 20 21.

N66-30119 **Field 9B**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
A USERS' GUIDE FOR SEARCH AND ITER.
by N. S. Newhall. 15 Apr 65, 37p NASA-CR-76113, JPL-TM-33-203
Contract NAS7-100

Descriptors: *Computer program, *Initial value problem, *Iteration, *Trajectory, Case, Computer, Fortran, Initial, Multiple, Parameter, Problem, Program, Source, Value, Variable.

For abstract, see STAR 04 17.

N66-30122 **Field 9B**
CFSTI Prices HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
AN ADAPTIVE NUMERICAL INTEGRATION ROUTINE FOR THE IBM 1620 II.
by E. H. Kopf Jr. 1 Jun 66, 22p NASA-CR-76110, JPL-TR-32-962
Contract NAS7-100

Descriptors: *Computer program, *Differential equation, *Ibm 1620 computer, *Numerical integration, Adaptive, Computer, Differential, Equation, Integration, Numerical, Program, Runge-kutta method, Symbol, Symbolic programming system (sps), System.

For abstract, see STAR 04 17.

N66-30204 **Field 9B**
CFSTI Prices HC$4.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
COMPUTER-AIDED DISPLAY CONTROL FINAL REPORT.
by D. C. Engelbart, W. K. English, and B. Huddart. Jul 65, 112p NASA-CR-66111
Contract NAS1-3988

Descriptors: *Cathode ray tube, *Computer method, *Control system, *Display system, Cathode, Computer, Control, Display, Human, Manipulation, Method, On-line programming, Ray, Symbol, System, Text, Tube.

For abstract, see STAR 04 17.

N66-30361 **Field 9B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROGRAM DOCUMENTATION.
by H. R. Stagner. Feb 66, 19p NASA-TM-X-55538, X-564-66-73

Descriptors: *Computer program, *Maintenance, *Program management, Coding, Computer, Console, Description, Documentation, Management, Operation, Program, Specification, Standard, Structure.

For abstract, see STAR 04 17.

N66-30491 **Field 9B**
CFSTI Prices HC$1.00 MF$0.50
Polish Academy Of Sciences, Warsaw.
SOME REMARKS RELATIVE TO PROPERTIES OF THE DEKATRONS EZ10B IN THE FAST COMPUTER SYSTEMS.
Niektore Uwagi Dotyczace Wlasciwosci Dekatronow Ez10b W Szybkich Urzadzeniach Liczacych
by R. Andrzejak, and S. Wojtowicz. 1966, 15p INR-686/III/E
In Polish, English Summary

Descriptors: *Counting rate computer, *Decimal-to-binary conversion, Adaptation, Algebra, Binary, Computer, Conversion, Count, Decimal, Dekatron, Fast, Rate, System.

For abstract, see STAR 04 17.

N66-30527 **Field 9B**
CFSTI Prices HC$5.50 MF$2.75
Martin Co., Baltimore, Md.
A USER'S MANUAL FOR THE AUTOMATIC SYNTHESIS PROGRAM (PROGRAM C).
by T. S. Englar, and R. E. Kalman. Jun 66, 578p NASA-CR-475
Contract NAS2-1107

Descriptors: *Computer program, *Mathematics, Algebra, Analysis, Automatic, Computer, Design, Digital, Digital computer, Linear, Matrix, Program, Synthesis, System, Theory.

For abstract, see STAR 04 17.

N66-30825 **Field 9B**
CFSTI Prices HC$2.00 MF$0.50
Nuclear Utility Services, Inc., Washington, D. C.
PROJECT CUBED - A CODE TO UNFOLD BREMSSTRAHLUNG EXPERIMENTAL DISTRIBUTIONS FIRST QUARTERLY REPORT, 13 JAN. - 13 APR. 1966.
by J. J. Steyn. 1966, 29p NASA-CR-76291
Contract NAS5-10133

Descriptors: *Bremsstrahlung, *Code, *Computer program, *Photon, *Scintillation spectrometer, Computer, Digital, Distribution, Fortran, Gamma, Ibm 7094 computer, Iodide, Iteration, Program, Scintillation, Sodium, Spectrometer.

For abstract, see STAR 04 17.

N66-31218 **Field 9B**
CFSTI Prices HC$4.00 MF$1.00
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE AMTRAN SAMPLER SYSTEM INSTRUCTION MANUAL.
by M. R. Albert, P. C. Clem, L. A. Flenker, J. Reinfelds, and R. N. Seitz. Jul 66, 144p NASA-TM-X-53342
Revised

Descriptors: *Ibm 1620 computer, *Instruction, *On-line programming, Automatic, Computer, Differential, Display, Efficiency, Equation, Graph, Language, Logic, Manual, Mathematics, Nonlinear, Operator, Programming, Remote, Sampler, Software, Terminal, Translator.

For abstract, see STAR 04 17.

N66-31368 **Field 9B**
CFSTI Prices HC$5.00 MF$1.00
Lockheed Missiles And Space Co., Sunnyvale, Calif.
IMPLEMENTATION INVESTIGATIONS OF ZVA/FVA COMPRESSION ALGORITHMS SUMMARY REPORT, 1 JUL. 1965 - 28 FEB. 1966.
by H. N. Massey, and W. E. Smith. 28 Feb 66, 156p NASA-CR-76389, LMSC-669224
Contract NAS8-5110

Descriptors: *Algorithm, *Data compressor, *Integration, *Test program, Breadboard, Buffer, Circuit, Compressor, Data, High, Hybrid, Logic, Memory, Monitor, Output, Program, Signal, Simulator, Speed, Storage, Test

For abstract, see STAR 04 17.

N66-31376 **Field 9B**
CFSTI Prices HC$2.00 MF$0.50
National Bureau of Standards, Washington, D. C.
THE NBS CORD TIME SHARING SYSTEM.
by T. N. Pyke. 1 Apr 66, 26p NASA-CR-76398, NBS-9339
NASA ORDER R-09-022-039

Descriptors: *Command system, *Computer program, *Time sharing, Code, Command, Computer, Device, Display, Error, Instruction, Machine, Operation, Program, Remote, Sharing, System, Teletype, Time, Use.

For abstract, see STAR 04 17.

N66-31377 **Field 9B**
CFSTI Prices HC$2.00 MF$0.50
National Bureau of Standards, Washington, D. C.
M O BIDIC - TELETYPE INTERFACE.
by O. R. Hall. Apr 66, 37p NASA-CR-76399, NBS-9338
NASA ORDER R-09-022-039

Descriptors: *Communication system, *Digital computer, *Teletype, Character, Communication, Computer, Control, Digital, Electric, Information, Interface, Logic, System, Twin, Two, Way.

For abstract, see STAR 04 17.

N66-32253 **Field 9B**
CFSTI Prices HC$7.64 MF$3.50
Avco Corp., Lowell, Mass. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Space Systems Div.
JPL ENTRY VEHICLE DESIGN COMPUTER PROGRAM USERS MANUAL.
26 May 66, 714p NASA-CR-76680, AVSSD-0001-66-RR
Contracts NAS7-100, JPL-951070
Prepared For Jpl

Descriptors: *Aerodynamics, *Computer program, *Reentry vehicle, Atmospheric, Computer, Design, Entry, Flow, Fortran, Information, Input, Mathematics, Model, Procedure, Program, Reentry, Routine, Structural, Thermal, Vehicle.

For abstract, see STAR 04 17.

N66-32685 **Field 9B**
CFSTI Prices HC$3.00 MF$0.75
Radio Corp. Of America, Van Nuys, Calif. West Coast Div.
DATA LINK EQUIPMENT FOR SATURN GROUND COMPUTER SYSTEMS FINAL TECHNICAL SUMMARY REPORT.
Oct 65, 110p NASA-CR-76900, TP-1345
Contract NAS8-11582

Descriptors: *Computer, *Data link, *Ground support equipment, *Saturn launch vehicle, Component, Control, Data, Design, Equipment, Ground, Launch vehicle, Link, Logic, Performance, Power, Program, Reliability, Saturn, Support, System.

For abstract, see STAR 04 17.

N66-37280 **Field 9B**
CFSTI Prices HC$3.00 MF$1.00
Honeywell, Inc., Minneapolis, Minn. Systems And Research Div.
SPACEBORNE MEMORY ORGANIZATION INTERIM REPORT.
by D. C. Gunderson, C. W. Hastings, and G. J. Prom. 15 Dec 65, 121p NASA-CR-78278, HONEYWELL-12017FRI
Contract NAS12-38

Descriptors: *Memory, *Unmanned spacecraft, Association, Computation, Computer, Data, Exploration, Onboard, Organization, Planet, Spacecraft, System, Unmanned.

For abstract, see STAR 04 22.

PB-170 796 **Field 9B**
CFSTI Prices: HC$7.60 MF$0.75
Michigan Univ., Ann Arbor. Dept. of Electrical Engineering.
A STUDY OF SYSTEM DESIGN CONSIDERATIONS IN COMPUTERS FOR SYMBOL MANIPULATION,
by David Chai, and Jack DiGiuseppe. May 65, 76p Rept. no. 05635-1-F
Grant NSF-GP-786

Descriptors: (*Digital computers, Design), (*Programming languages, Digital computers), Pattern recognition, Programming (Computers), Information retrieval, Artificial intelligence.

Identifiers: Symbol manipulation, List processors.

The purpose of the study was to investigate symbol manipulation, and to determine properties which would aid the design of computers specifically for symbol manipulation. The investigation was confined to two important areas of symbol manipulation: list processing and string manipulation. Methods of storing non-numeric information are reviewed and evaluated. Special-purpose symbol manipulation languages as well as other languages with symbol manipulation capabilities are surveyed and examined for significant properties. Some capabilities which a list processor or string manipulator should have are outlined. Certain capabilities such as pattern matching are discussed in detail. Two current symbol manipulation machines are described and the symbol manipulation capabilities of some current general purpose computers are discussed. The appendix contains the description and listing of a computer program for the determination of circuit impedances written in the SNOBOL language. The purpose of the program was to provide an instructive exercise in string manipulation.

PB-173 291 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
Environmental Science Services Administration, Boulder, Colo. Inst. for Telecommunication Sciences and Aeronomy.
AN INTRODUCTION TO SAMPLED DATA AND SWITCHING LOGIC,
by Thomas L. Davis. 1 Apr 66, 71p
NBS-TN-334

Descriptors: (*Computer logic, Functions), Analog-to-digital converters, Training devices, Fourier analysis, Statistical functions, Algebras, Computers, Binary arithmetic.

Identifiers: Switching logic.

The report presents introductory material on the subjects of Fourier series and integral representations of data, operations on data (i.e. correlation, convolution, and sampling), Boolean algebra, and combinatorial logic circuits. The presentation is tutorial and stresses the operations and their effects, rather than mathematical rigor. (Author)

PB-173 335 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Dept. of Computer Science.
AN INTERPRETER FOR 'IVERSON NOTATION',
Technical rept.,
by Philip S. Abrams. 17 Aug 66, 64p CS-47

Descriptors: (*Programming languages, *Computers), Programming (Computers), Vocabulary, Programmed instruction, Coding, Binary arithmetic.

Identifiers: Iverson notation, FORTRAN IV.

Kenneth E. Iverson's book, A Programming Language (4), presented a highly elegant language for the description and analysis of algorithms. Although not widely acclaimed at first, 'Iverson notation' (referred to as 'the language' in this report) is coming to be recognized as an important tool by computer scientists and programmers. The current report contains an up-to-date definition of a subset of the language, based on recent work by Iverson and his colleagues. Chapter III describes an interpreter for the language, written jointly by the author and Lawrence M. Breed of IBM. The remainder of the paper consists of critiques of the implementation and the language, with suggestions for improvement. (Author)

PB-173 336 **Field 9B**
CFSTI Prices: HC$4.60 MF$0.50
Northwestern Univ., Evanston, Ill. Technological Inst.
A HEURISTIC APPROACH TO NATURAL LANGUAGE PROCESSING,
by Denis M. Manelski, and Gilbert K. Krulee. 1965, 47p
Grant NSF-G-17951
Prepared in cooperation with Shell Oil Co., New York. NSF Scientific Documentation Project. Prepared for presentation at the International Conference on Computational Linguistics (1965).

Descriptors: (*Computational linguistics, Programming languages), Programming (Computers), Programmed instruction, Linguistics, Vocabulary, Man-machine systems, Information theory.

The recent revolution of programming languages has tended to improve communication between man and computer. The use of mnemonics, automatic storage allocation, English-like operators (such as in COBOL) and problem-oriented languages has greatly facilitated the task of the programmer. Thus, the solution algorithm for a large class of computational problems can be defined with relative ease in languages such as FORTRAN and ALGOL, specifically designed for these classes of problems. This paper describes an attempt to further simplify the communication between programmer and computer by defining a system which can produce a formal description from its natural (verbal) input. In order to study this approach a specific problem area was chosen, the propositional or statement calculus. It will be evident that the problem area chosen has influenced the design of the system; nonetheless it should be clear that the linguistic capabilities of the system are general rather than specific to the problem context. (Author)

AD-244 705 See Field 15E
AD-435 103 See Field 5G
AD-468 096 See Field 15G
AD-640 621 See Field 19E
AD-640 647 See Field 5H
AD-640 652 See Field 5H
AD-640 654 See Field 5I
AD-640 658 See Field 5B
AD-640 666 See Field 19D
AD-640 821 See Field 9E
AD-640 827 See Field 5I
AD-640 836 See Field 17B
AD-641 058 See Field 7A
AD-641 082 See Field 20D
AD-641 178 See Field 6D
AD-641 267 See Field 5B
AD-641 278 See Field 6C
BNWL-236 See Field 18F
DP-1031 See Field 18H
I 27.54:3 See Field 8M
PB-173 192 See Field 18I
PB-173 311 See Field 5G
PB-173 376 See Field 5B

9C. ELECTRIC AND ELECTRONIC ENGINEERING

AD-441 248 **Field 9C, 5I**
CFSTI Prices: HC$3.00 MF$0.50
Human Resources Research Office, George Washington Univ., Alexandria, Va.
FORECAST SYSTEMS ANALYSIS AND TRAINING METHODS FOR ELECTRONICS MAINTENANCE TRAINING,
by Edgar L. Shriver, C. Dennis Fink, and Robert C. Trexler. May 64, 53p HumRRO-RR-13
Contract DA-44-188-ARO-2
Proj. DA-2J024701A712
See also AD-637 726.

Descriptors: (*Training devices, Malfunctions), (*Maintenance, Training), Transfer of training, Analysis, Experimental data, Stimulation, Electrical equipment, Electronic equipment, Circuits.

Identifiers: Forecast.

The research presented in this report was directed primarily toward troubleshooting electronic weapon systems. Its principal findings bear upon three interconnected problems: (1) develop training content based upon a cue-response paradigm; (2) developing training and job methods and aids, such as mock-ups, substitute or obsolete equipment and block diagrams for troubleshooting; (3) planning and managing personnel, with special reference to transition training from old to new weapon systems. Results of the studies made suggest that training based on forecast methods of analysis produces men capable of effectively performing the job with less training time than that needed for traditional instruction in electronics maintenance. (Author)

AD-442 070 **Field 9C**
CFSTI Price: HC$4.60
Westinghouse Electric Corp., Washington, D. C.
HIGH CURRENT AND HIGH VOLTAGE SILICON CONTROLLED RECTIFIERS.
Quarterly rept. nos. 6 and 7, 1 Oct 63-31 Mar 64. 31 Mar 64, 47p
Contract NObsr-87647
Proj. SR-0080301
Task 9348

Descriptors: (*Crystal rectifiers, Electronic switches), Silicon, Electron microscopy, Test facilities, Test equipment (Electronics), Tests, Electrical properties, Gallium, Impurities, Crystal structure, Diffusion, Alloys, Surface properties.

Identifiers: Silicon controlled rectifiers.

Testing facilities for evaluation of thermal impedance, peak forward drop and 10,000 amperes surge current are described. Transmission electron microscope study on materials under the influence of processing was used to assist process control. Effects of crystal materials on junction characteris-

tics are described. The studies confirm the use of 1.125-inch diameter material as the best choice for the state-of-the-art development. (Author)

AD-475 795 **Field 9C, 10B**
CFSTI Prices: HC$4.00 MF$1.00
Honeywell, Inc., Hopkins, Minn. Ordnance Div.
GENERATOR, DIRECT CURRENT, G-54 ( )/G (HAND CRANKED).
Interim rept. no. 2, 1 Jan 62-31 Jul 65,
by R. H. Cole. 31 Jul 65, 128p
Contract DA-36-039-SC-87331
Task 1E6-40306-D-488-07

Descriptors: (*Hand generators, Design), Direct current, Suspension devices, Reduction, Noise, Tests, Hand cranks, Drives, Voltage, Switching circuits, Voltage regulators, Gears, Magnesium, Aluminum, Alternating current, Glass textiles, Plastics, Mounting brackets.

The development achievements of this report period on the G-54 Generator can be divided into three phases: (1) analyses and research leading up to and the recommendations embodied in the Design Plan, (2) fabrication and testing of the first and second experimental models, and (3) the design of the development model. In the Design Plan, both a conventional drive and a Harmonic Drive were recommended, and upon approval of USAECOM, were fabricated into the first experimental models. These units were evaluated and it was determined that improvements in the mounting assembly, electronic regulator, and acoustic noise emission level were desired. Noise reduction, consequently, became one of the major areas of development effort. Subsequent to studies and testing of various gearing and mounting concepts, a resilient suspension system was developed that reduced the noise level to within the tolerance limits specified. The development units will incorporate the Harmonic Drive assembly, determined to be more compatible with the program objectives than the conventional drive during testing of the experimental models. The basic electric circuit of the experimental units will be used for the development models, except that modifications were effected to reduce ripple voltage, provide automatic switching from voltage to current control, and improve the operation of the circuit under all environmental conditions. Further design modifications in the development unit are (1) a magnesium housing, (2) an improved crank, (3) a modified aluminum scissors mount, and (4) an improved strap and buckle arrangement for securing the generator to trees or poles. (Author)

AD-640 927 **Field 9C, 12B**
Not available from CFSTI.
Illinois Univ., Urbana. Coordinated Science Lab.
SYNTHESIS OF INTERCONNECTED LINEAR TIME-VARYING SYSTEMS.
by William R. Perkins. 1966, 4p
Contract DA-28-043-AMC-00073 (E), Grant AF-AFOSR-931-65
Proj. AF-9749
Task 974901
AFOSR-66-0391
Availability: Published in Proceedings of the National Electronics Conference v21 p694-6 1965.

Descriptors: (*Control systems, Synthesis), (*Input-output devices, Synthesis), Linear systems, Combinatorial analysis, Feedback.

Identifiers: Time-varying systems, State variables.

The development of general analysis and synthesis methods for linear, time-varying systems has proved to be very challenging. The major difficulty is that most time-varying differential equations cannot be solved in closed form analytically. Recently an approach based on an operator algebra has been introduced by Stubberud. This method does not require differential equation solution, and permits synthesis of a class of control systems. The main difficulty is the considerable labor involved in manipulating the time-varying operators. The purpose of this paper is to develop a simple state-variable method that is useful in the synthesis of time-varying systems, and that requires neither the solution of differential equations nor the manipulation of time-varying operators. (Author)

AD-641 112 **Field 9C, 14D**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE OPERATIONAL RELIABILITY OF ELECTRONIC EQUIPMENT,
by Petre Sipos. 18 Apr 66, 23p FTD-TT-65-1166
TT-66-62523
Edited trans. of Telecomunicatii (Rumania) v8 n2 p73-8 1964.

Descriptors: (*Electronic equipment, *Reliability (Electronics)), Rumania, Probability, Failure (Electronics), Standards.

Conclusions: (1) Knowledge of probability calculations and mathematical statistics is necessary for successful solution of problems in operational reliability. In general, statistical methods do not present especially difficult problems in the study of reliability. Usually, the difficulty consists in logical statement of the given problem. In the same way, statistics provide the theoretical basis for many practical solutions, which are purely intuitive in most cases. (2) Standardization and miniaturization of components is an important means for increasing the reliability of electronic equipment. Additionally, when it is economically and technically reasonable, it is recommended that components that have a high failure risk be kept as spares. To increase reliability further it is also necessary to choose reliable components, adequate operating conditions, and finally, to make failure predictions. (3) It is absolutely necessary to establish reliability standards for the various types of electronic equipment. For this it is necessary to use one of the most complete reliability characteristic, such as the average duration of normal operation. These reliability standards must be introduced in the early design stages. (4) It is necessary to establish an adequate terminology for reliability theory; the terminology used in this article is not to be considered definitive. (5) As the quantities and complexity of electronic equipment increase, it is absolutely necessary that reliability be considered as one of the most important parameters of the equipment. (Author)

N66-30080 **Field 9C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
THEORY OF OPEN-ENDED CIRCULAR CYLINDRICAL MICROWAVE CAVITY.
by N. C. Wenger. Jul 66, 40p NASA-TN-D-3514

Descriptors: *Circular cylinder, *Laplace transform, *Microwave frequency, *Resonant cavity, *Wiener-hopf equation, Cavity, Circular, Cylinder, End, Frequency, Microwave, Open, Oscillation, Resonant, Theory, Waveguide.

For abstract, see STAR 04 17.

N66-30172 **Field 9C**
CFSTI Prices HC$3.00 MF$0.75
Auburn Research Foundation, Inc., Ala. Sampled-data Control Systems Group.
DIGITAL COMPENSATION OF THE THRUST VECTOR CONTROL SYSTEM TECHNICAL REPORT NO. 2, 13 NOV. 1964 - 28 MAY 1965.
28 May 66, 85p NASA-CR-76103
Contract NAS8-11274

Descriptors: *Saturn launch vehicle, *Thrust vector control (tvc), *Transfer function, Compensation, Control, Digital, Function, Hold, Input, Launch vehicle, Loop, Open, Pulse, Sampler, System, Thrust, Transfer, Vector.

For abstract, see STAR 04 17.

N66-30281 **Field 9**
CFSTI Prices HC$1.00 MF$0.50
Tennessee Univ., Knoxville. Dept. Of Electric Engineering.
ADAPTIVE CONTROL SYSTEMS, A GENERAL CLASSIFICATION SCHEME TECHNICAL NOTE NO. 2.
by N. K. Sinha. 30 Oct 64, 18p NASA-CR-5954
Grant NSG-351

Descriptors: *Adaptive control system, *Finite-state machine, *Learning system, Adaptive, Basic, Classification, Control, Dynamic, Finite, Learning, Machine, State, Static, System.

For abstract, see STAR 04 17.

N66-30354 **Field 9**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration Goddard Space Flight Center, Greenbelt, Md.
SPECTRAL DEGRADATION OF FREQUENCY SYNTHESIZERS.
by E. H. Johnson, and T. E. Mc gunigal. Apr 66, 28p NASA-TM-X-55531, X-523-66-197

Descriptors: *Electronic equipment testing, *Frequency synthesis, Degradation, Density, Electronic, Equipment, Fluctuation, Frequency, Phase, Radio, Spectral, Synthesis, Synthesizer, Testing.

For abstract, see STAR 04 17.

N66-30364 **Field 9**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration Goddard Space Flight Center, Greenbelt, Md.
POWER SWITCHING IN DIGITAL SYSTEMS.
by R. A. Cliff. Jul 66, 12p NASA-TN-D-3477

Descriptors: *Digital computer, *Power gain, *Spacecraft power supply, Battery, Circuit, Computer, Consumption, Digital, Flip-flop, Gain, Gate, Hardware, Integration, Magnetohydrodynamics, Optical, Power, Spacecraft, Supply, Switching, Transmission.

For abstract, see STAR 04 17.

N66-30405 **Field 9**
CFSTI Prices HC$4.00 MF$0.75
Georgia Inst. Of Tech., Atlanta. School Of Electrical Engineering.
A STUDY OF THE LOW-PASS CHARACTERISTICS OF LOADED RC DISTRIBUTED NETWORKS RESEARCH REPORT, DEC. 1, 1964 - MAR. 31, 1966.
by W. F. Speights Jr, and K. L. Su. 1966, 104p
NASA-CR-76156
Contract NGR-11-002-020

Descriptors: *Impedance, *Miniature electronic equipment, *Rc network, *Voltage, Capacitance, Circuit, Distribution, Electronic Equipment, Film, Load, Miniature, Network, Resistance, Termination, Thin, Transfer.

For abstract, see STAR 04 17.

N66-30601 **Field 9**
CFSTI Prices HC$4.00 MF$1.00
Auburn Research Foundation, Inc., Ala.
DIGITAL COMPENSATION OF THE THRUST VECTOR CONTROL SYSTEM TECHNICAL REPORT NO. 3, 28 MAY - 28 SEP. 1965.
by H. M. Summer. 28 Sep 65, 128p NASA-CR-76231
Contract NAS8-11274

Descriptors: *Control system, *Sampled data system, *Thrust vector control (tvc), Analysis, Compensation, Control, Data, Digital

Function, Sampling, System, Thrust, Transfer, Vector.

For abstract, see STAR 04 17.

N66-30753 Field 9C
CFSTI Prices HC$3.00 MF$0.75
Auburn Research Foundation, Inc., Ala.
DIGITAL COMPENSATION OF THE THRUST VECTOR CONTROL SYSTEM FOURTH TECHNICAL PROGRESS REPORT, 28 SEP. 1965 - 28 JAN. 1966.
by H. M. Summer. 1966, 92p NASA-CR-76326
Contract NAS8-11274

Descriptors: *Sampled data system, *Stability, *Thrust vector control (tvc), Attitude, Channel, Compensation, Control, Data, Design, Digital, Electronics, Instability, Margin, Multiloop, Sample, System, Thrust, Vector.

For abstract, see STAR 04 17.

N66-30797 Field 9C
CFSTI Prices HC$2.00 MF$0.50
Auburn Research Foundation, Inc., Ala.
EVALUATION OF PHASE DELAY IN A CRYSTAL MIXER TECHNICAL REPORT NO. 2.
by H. M. Summer. 16 Mar 64, 43p NASA-CR-76297
Contract NAS8-5231

Descriptors: *Crystal, *Mixer, *Phase shift, Current, Delay, Diode, Evaluation, Impedance, Measurement, Oscillator, Output, Phase, Shift, Signal.

For abstract, see STAR 04 17.

N66-30851 Field 9C
CFSTI Prices HC$2.00 MF$0.50
Auburn Research Foundation, Inc., Ala. Radio Frequency Tracking Lab.
AN INVESTIGATION OF A VARACTOR-DIODE MODULATOR TECHNICAL REPORT NO. 3.
by H. M. Summer. 8 May 64, 50p NASA-CR-76357
Contract NAS8-5231

Descriptors: *Modulator, *Switching element, *Varactor diode, Bandwidth, Capacitance, Design, Diode, Element, Frequency, Insertion, Isolation, Loss, Low, Semiconductor, Shunt, Single, Switching, Varactor, Variable.

For abstract, see STAR 04 17.

N66-31224 Field 9C
CFSTI Prices HC$5.00 MF$1.25
Villanova Univ., Pa. Research And Development Lab.
COMPUTER-AIDED CIRCUIT ANALYSIS ANNUAL REPORT, MAY 15, 1965 - MAY 14, 1966.
by H. T. Koonce, and T. Yang. 1966, 182p NASA-CR-76373
Contract NGR-39-023-004

Descriptors: *Circuit, *Computer method, *Digital computer, Accuracy, Analysis, Computer, Digital, Generation, Ibm 1620 computer, Literature, Method, Monte carlo method, Number, Program, Random, Research, Search, Sharing, Time.

For abstract, see STAR 04 17.

N66-31231 Field 9C
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE DESIGN AND DEVELOPMENT OF A DYNAMIC BRUSH WEAR MEASUREMENT APPARATUS.
by J. C. Horton, and J. E. Owens. 8 Apr 66, 34p NASA-TM-X-53425

Descriptors: *Electric equipment, *High vacuum, *Wear testing machine, Apparatus, Brush, Calibration, Design, Electric, Equipment, Linear, Machine, Measurement, Output, Rate, Recorder, Testing, Transformer, Voltage, Wear.

For abstract, see STAR 04 17.

N66-31855 Field 9C
CFSTI Prices HC$4.00 MF$1.00
Lear Siegler, Inc., Grand Rapids, Mich.
A SPACECRAFT DIGITAL STABILIZATION AND CONTROL SYSTEM STUDY.
by H. C. Danbert, E. W. Hoffman, and T. E. Perfitt. Aug 66, 132p NASA-CR-520
Contract NASW-1004

Descriptors: *Digital technique, *Spacecraft control, *Stabilization, Accuracy, Computer, Control, Debug, Design, Digital, Duration, Microelectronics, Mission, Monolithic, Physical, Program, Reliability, Spacecraft, System, Technique.

For abstract, see STAR 04 17.

N66-32120 Field 9C
CFSTI Prices HC$4.25 MF$1.75
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile And Space Systems Div.
BENDING FEEDBACK CONTROL FINAL REPORT.
by W. K. Waymeyer. Jun 66, 304p NASA-CR-76557, DAC-59275
Contract NAS8-20087

Descriptors: *Launch vehicle, *Least squares method, *Optimal control, *Stability and control, Bending, Control, Estimation, Feedback, Filter, Flexible, Gain, Launch, Least, Method, Optimal, Parameter, Quadratic, Saturn v launch vehicle, Square, Stability, Vehicle.

For abstract, see STAR 04 17.

N66-32132 Field 9C
CFSTI Prices HC$7.59 MF$3.50
National Aeronautics And Space Administration, Washington, D. C.
ELECTROMAGNETIC COMPATIBILITY PRINCIPLES AND PRACTICES.
Oct 65, 709p NASA-TM-X-57763, NHB-5320.3

Descriptors: *Apollo project, *Electromagnetic compatibility, *Interference, Capacitor, Compatibility, Electromagnetic, Flux, Ground, Inductor, Magnetic, Resistor, Signal, Transmission.

For abstract, see STAR 04 17.

N66-32142 Field 9C
CFSTI Prices HC$3.00 MF$1.00
Illinois Univ., Urbana. Coordinated Science Lab.
COORDINATED SCIENCE LABORATORY PROGRESS REPORT FOR SEPTEMBER - NOVEMBER 1965.
21 Jan 66, 123p NASA-CR-76574, AD-627094
Grants NSG-376, NSG-443

Descriptors: *Control system, *Data reduction, *Electronic equipment, *Plasma physics, *Superconductor, *Thin film, Beam, Collision, Computer, Control, Damping, Data, Display, Electronic, Equipment, Film, Photograph, Physics, Plasma, Processing, Pump, Reduction, Satellite, Stability, Switching, System, Technology, Thin, Variance.

For abstract, see STAR 04 17.

N66-32283 Field 9C
CFSTI Prices HC$2.00 MF$0.50
Watkins-johnson Co., Palo Alto, Calif.
THE DESIGN AND PERFORMANCE OF A HIGH EFFICIENCY POWER CONVERSION SYSTEM FOR USE WITH THE WJ-274 TRAVELING-WAVE TUBE FINAL REPORT, PHASE I.
by G. S. Oleari. 1966, 33p NASA-CR-66146
Contract NAS1-3766

Descriptors: *Extraterrestrial environment, *Power conversion, *Spacecraft communications system, *Traveling wave tube, Communications, Compatibility, Current, Design, Direct, Environment, Extraterrestrial, Frequency, High efficiency, Module, Performance, Radio, Spacecraft, System, Telemetry, Temperature, Travel, Tube, Wave.

For abstract, see STAR 04 17.

N66-32293 Field 9C
CFSTI Prices HC$2.50 MF$0.75
California Univ., Berkeley. Electronic Research Lab.
COST-FUNCTION CHARACTERIZATION OF SYSTEMS.
by D. Chazan. 31 Mar 66, 96p NASA-CR-76731, ERL-66-5
Grant NSG-354

Descriptors: *Dynamic control, *Markov process, *Mathematics, Control, Convexity, Cost, Dynamic, Electronics, Function, Linear, Problem, Set, Space, Stability, Trajectory, Transform, Transition.

For abstract, see STAR 04 17.

N66-32294 Field 9C
CFSTI Prices HC$3.00 MF$1.00
Stanford Univ., Calif. Dept. Of Aeronautics And Astronautics.
MINIMUM TIME CONTROL OF A NONLINEAR SYSTEM.
by J. L. Almuzara, and I. Fluegge-lotz. May 66, 127p NASA-CR-76729, SUDAAR-271
Grant NSG-133-61

Descriptors: *Differential equation, *Nonlinear equation, *Time optimal control, Control, Differential, Equation, Function, Nonlinear, Optimal, Order, Periodic, Pontryagin principle, Problem, Representation, Second, System, Time.

For abstract, see STAR 04 17.

N66-32432 Field 9C
CFSTI Prices HC$2.50 MF$0.50
Autonetics, Anaheim, Calif.
A SELECTED ANNOTATED BIBLIOGRAPHY FOR SPACEBORNE MULTIPROCESSING STUDY.
by C. F. Lyau. 31 May 66, 54p NASA-CR-76756, T6-1225/3111
Contract NAS12-108

Descriptors: *Bibliography, *Information processing, *Space mission, Computer, Control, Fault, Industry, Information, Isolation, Logic, Mission, Multiple, Processing, Space, System.

For abstract, see STAR 04 17.

N66-32627 Field 9C
CFSTI Prices HC$2.50 MF$0.75
Space Craft, Inc., Huntsville, Ala.
QUALIFICATION TEST PROCEDURE FOR MULTICODER, MICROMINIATURE HIGH LEVEL.
1966, 84p NASA-CR-65432
Contract NAS9-4396

Descriptors: *Electronic equipment testing, *Environmental testing, *Microminiaturized electronic equipment, *Spacecraft electronic equipment, Altitude, Coder, Crosstalk, Current, Dust, Electronic, Environment, Equipment, Feedback, Impedance, Interference, Launch, Linearity, Microminiaturization, Noise, Output, Power, Pulse, Reentry, Sand,

Scattering, Shock, Spacecraft, Temperature, Testing, Vibration, Voltage.

For abstract, see STAR 04 17.

N66-32679 **Field 9C**
CFSTI Prices HC$2.00 MF$0.50
Auburn Research Foundation, Inc., Ala.
RADIO FREQUENCY SYSTEMS. MILLIMETER WAVES STUDY SEVENTH QUARTERLY PROGRESS REPORT, 1 SEP. - 1 DEC. 1965.
1965, 30p NASA-CR-76916
Contract NAS8-11184

Descriptors: *Frequency regulator, *Millimeter wave, *Power supply, *Television transmission, *Transistor amplifier, Amplifier, Dc, Excitation, Frequency, Microwave, Millimeter, Multiplier, Oscillator, Output, Packaging, Power, Regulator, Supply, Television, Temperature, Transistor, Transmission, Voltage, Wave.

For abstract, see STAR 04 17.

N66-36782 **Field 9C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EXTENSION OF POPOV'S THEOREMS FOR STABILITY OF NONLINEAR CONTROL SYSTEMS.
by H. T. Chieh, and Y. H. Ku. 23 Jun 66, 26p
NASA-TM-X-53477

Descriptors: *Control system, *Nonlinear system, *Stability and control, Analog, Asymptote, Computer, Control, Extension, Nonlinear, Stability, System, Theorem.

For abstract, see STAR 04 22.

N66-37324 **Field 9C**
CFSTI Prices HC$3.00 MF$0.75
Santa Barbara Research Center, Goleta, Calif.
FIVE-CHANNEL SCANNING RADIOMETER QUARTERLY REPORTS 17, 18, AND 19, 15 OCT. 1964 - 15 JUL. 1965.
by F. R. Malinowski. 5 Aug 65, 93p NASA-CR-78174
Contracts NAS5-757, NAS5-3648
Its Rept.-2060-q17-18-19

Descriptors: *Calibration, *Infrared instrument, *Radiometer, Channel, Environment, Filter, Five, Infrared, Medium, Orbital, Resolution, Scanning, Simulation, Temperature, Testing, Transmission.

For abstract, see STAR 04 22.

N66-37574 **Field 9C**
CFSTI Prices HC$3.00 MF$0.75
New Hampshire Univ., Durham. Dept. Of Physics.
AN ELECTRIC FIELD METER FOR ROCKET AND SATELLITE USE.
by W. E. Potter. Sep 66, 99p NASA-CR-78389, UNH-66-4
Grant NSG-624

Descriptors: *Electric field, *Electrometer, *Sounding rocket, Charge, Effect, Field, High, Impedance, Ionospheric, Magnetosphere, Measurement, Motion, Particle, Plasma, Satellite.

For abstract, see STAR 04 22.

N66-37603 **Field 9C**
CFSTI Prices HC$1.00 MF$0.50
Arkansas Univ., Little Rock. Dept. Of Electronics And Instrumentation.
OPERATION INSTRUCTIONS FOR THE COLD ELECTRON SOURCE FINAL REPORT, PART II.
by B. E. Gilliland, W. G. Hinson, and R. W. Raible. 23 Sep 66, 19p NASA-CR-78340
Grant NSG-260

Descriptors: *Electron source, *Maintenance, Cold, Control, Deuterium, Dynode, Emission, Field, Magnetic, Manual, Operation, Procedure.

For abstract, see STAR 04 22.

PB-173 138 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Data-Design Labs., Ontario, Calif.
CRYSTAL CALIBRATOR 111B (MEASUREMENTS).
Technical manual instrument calibration procedure AG-78.
15 Jul 66, 9p
Contract N123 (62861)53723A
NAVAIR-17-20AG-78

Descriptors: (*Radiofrequency oscillators, Calibration), (*Crystal oscillators, Calibration), Test equipment (Electronics), Modulation, Frequency, Measuring devices (Electrical + electronic).

The Test Instrument is a crystal controlled radiofrequency oscillator used to align radio receivers and transmitters at the fundamental and harmonic frequencies of the oscillators contained in the unit. (Author)

PB-173 288 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Electric Power Branch.
INFLUENCE OF EXCITATION CONTROL UPON POWERLINE STABILITY - AN ANALOG STUDY.
12 May 66, 31p BR-EP-16

Descriptors: (*Electric power production, Stability), (*Stability, Damping), Electric governors, Excitation, Voltage regulators, Generators, Networks, Frequency, Electrical engineering.

Identifiers: Power systems, Electric analogs.

Damping of power system oscillations by supplementary control of excitation was studied by analog techniques. A simplified representation of a single machine operating through a transmission line to an infinite bus was developed which retains the pertinent parameters. Processes are discussed by which excitation influences damping with no automatic control, with the customary control to constant terminal voltage, and with special supplementary control. These studies show that high-speed control of excitation to maintain constant terminal voltage is detrimental to system stability. Supplementary control of excitation with a specially developed function of speed is indicated to be superior to supplementary control by rate of change of terminal voltage and greatly improves system stability. (Author)

AD-640 860 **See Field 6P**

AD-640 926 **See Field 12B**

AD-641 114 **See Field 12B**

AD-641 186 **See Field 12B**

9D. INFORMATION THEORY

AD-640 686 **Field 9D**
CFSTI Prices: HC$1.00 MF$0.50
Hawaii Univ., Honolulu. Dept. of Electrical Engineering.
SOME REMARKS ON THE VECTOR SUBSPACES OF A FINITE FIELD,
by R. L. Pele. 20 Jun 66, 13p Scientific-8
Contract AF 19 (628)-4379
Proj. AF-5628
Task 562801
AFCRL-66-477

Descriptors: (*Coding, Theory), Algebra, Polynomials, Transformations (Mathematics), Vector analysis.

Let F be a finite field of elements and E an extension of F of degree n. Consider E as a vector space over F. It is shown that for every subspace V of E there exists a unique polynomial whose roots are the elements of V, and there exists a unique polynomial g (X) of the same form, but of degree q (n-r), such that g (E) = V, where r is the dimension of V. Furthermore f (X) and g (X) split completely in E, and f (g (X)) = g (f (X)) = Xq (n) - X. (Author)

AD-640 801 **Field 9D**
CFSTI Prices: HC$1.00 MF$0.50
Electronic Systems Div., L. G. Hanscom Field, Mass. Decision Sciences Lab.
THE EFFECT OF CONTEXT ON RECALL AND RECOGNITION OF LONG VERBAL SERIES,
by William H. Sumby. Jun 66, 22p
Proj. AF-7682
Task 768201
ESD-TR-66-278

Descriptors: (*Recall, *Information theory), Language, Memory, Probability, Search theory, Statistical analysis.

Identifiers: Words, Context.

The effects of context on the recall and recognition of words in that context were investigated under a variety of constraints. Results indicate that (1) the recall of a particular word in a sentence when the sentence is presented for a second time with that word omitted is a direct function of the probability of the word occurring within the context, regardless of the word-frequency in the language; (2) recognition of a particular word in a sentence is not influenced by the probability of the word occurring within the context; (3) in recognition there is a strong response bias to identify a word as having previously occurred when long series of material are shown; (4) in both recall and recognition there is a highly significant relationship between the confidence which is assigned to the response and the correctness of that response. The results are discussed in terms of retrieval of material from memory as involving a search process. (Author)

AD-640 930 **Field 9D, 17B**
Not available from CFSTI.
Illinois Univ., Urbana. Coordinated Science Lab.
PROPERTIES OF LOSSY COMMUNICATION NETS.
Revised ed.,
by W. Mayeda, and M. E. Van Valkenburg. 20 Apr 65, 7p
Contract DA-28-043-AMC-00073 (E), Grant AF-AFOSR-931-65
Proj. AF-9749
Task 974901
AFOSR-66-0245
Revision of manuscript submitted 10 Apr 64.
Availability: Published in IEEE Transactions on Circuit Theory vCT-12 n3 p334-8 Sep 1965.

Descriptors: (*Communication systems, *Networks), Matrix algebra, Set theory.

A communication net is considered in which the edges are lossy in the sense that flow through the edge is attenuated. Such a model describes many power or information transmission systems. The classical problem for such a net is that of maximizing the flow from a source to a sink. The solution to the problem for the lossless case is well known; the lossy case has been considered only recently by Fujisawa.

AD-640 984 **Field 9D**
CFSTI Prices: HC$2.00 MF$0.50
Parke Mathematical Labs., Inc., Carlisle, Mass.

A STUDY OF ERROR-CORRECTING CODES: I,
by L. Calabi, and L. K. Arquette. Aug 66, 35p
Scientific-8
Contract AF 19(628)-3826
Proj. AF-8681
Task 868102
AFCRL-66-627

Descriptors: (*Coding, Errors), Corrections, Information theory, Mapping (Transformations), Binary arithmetic.

Identifiers: Error-correcting codes.

A formal study is made of the following properties of error-correcting codes: irredundance, precorrecting, and correcting. (Author)

AD-641 042 **Field 9D**
Not available from CFSTI.
Delaware Univ., Newark. Dept. of Electrical Engineering.
INFORMATION CAPACITY OF A PHOTOELECTRIC DETECTOR,
by B. E. Goodwin, and L. P. Bolgiano Jr. 9 Aug 65, 4p
Grant AF-AFOSR-2-65
Proj. AF-9758
Task 976802
AFOSR-66-0528
Availability: Published in Proceedings of the IEEE v53 n11 p1745-6 Nov 1965.

Descriptors: (*Demodulators, Photoelectric effect), (*Information theory, Demodulators), Power series.

Identifiers: Photodetectors.

A simple expression was obtained for the information capacity of a photodetector. Defining I (E;N) as the average information transmitted through a channel (the transinformation), it was found that this could be expressed by a simple power series.

AD-641 060 **Field 9D**
Not available from CFSTI.
New York Univ., N. Y. Dept. of Electrical Engineering.
UNEQUAL ERROR PROTECTION CODES,
by Burt J. Masnick, and Jack K. Wolf. 1965, 9p
Grant AF-AFOSR-499-65
Proj. AF-9749
Task 974901
AFOSR-66-0109
Availability: Published in IEEE Mohawk Valley Communications Symposium (NATCOM) p205-12 Oct 1965.

Descriptors: (*Coding, Errors), Information theory, Matrix algebra, Combinatorial analysis, Digital systems, Countermeasures.

Identifiers: Error protection codes.

The theoretical basis for the construction of a new class of linear codes which provides different levels of error protection for different digits of the code word is introduced. Examples of such codes are presented and some construction methods are devised and verified. Upper and lower bounds on the required redundancy for such codes are derived. (Author)

AD-641 061 **Field 9D**
Not available from CFSTI.
Washington Univ., St. Louis, Mo.
AN INFORMATION THEORY VIEWPOINT FOR THE GENERAL IDENTIFICATION PROBLEM,
by John Zaborszky. 20 Sep 65, 4p
Grant AF-AFOSR-482-65
Proj. AF-9749
Task 974901
AFOSR-66-0881
Availability: Published in IEEE Transactions on Automatic Control vAC-11 n1 p130-1 Jan 1966.

Descriptors: (*Information theory, Identification), Numerical methods and procedures.

The paper proposes an information theory approach as a unifying principle for ordering the large numbers of specific identification techniques introduced in recent years. This ordering principle is not all inclusive, however, since it basically concerns information that can be gained and ignores such equally vital aspects of identification as the amount of computation needed. It is not a trivial matter to evaluate the proposed concepts for specific situations. (Author)

AD-641 132 **Field 9D, 5G, 5H, 17B K**
CFSTI Prices: HC$4.00 MF$1.00
Illinois Univ., Urbana. Engineering Experiment Station.
A METHOD OF DECODING SPEECH.
Technical rept.,
by Jeno Gazdag. Jun 66, 138p TR-9
Contract AF 33(657)-10659, Grant AF-AFOSR-7-66
Proj. AF-9769
Task 976904
AFOSR-66-2385
Contracts AF 33(615)-2573, AF 33(615)-3890, Grant PHS-GM-10718.

Descriptors: (*Speech, *Decoding), Speech recognition, Phonetics, Band-pass filters, Bandwidth, Experimental data, Man-machine systems, Voice communication systems, Information theory.

A method is presented for decoding speech that uses 'machine events' as the basic linguistic units, in contrast with phonemes and other units employed in other studies. The machine events are represented as multidimensional binary vectors. Utterances of words are expressed as sequences of binary vectors. Spoken words are decoded as sub-sequences of machine events. Decoding is independent of time, i.e., it does not depend on the duration of the speech signal. Results are given of small-scale tests of the decoding method. The experimental apparatus consisted of a 12-channel short-time spectrum generator and a machine-event generator that implemented six hyperplanes and a human who assumed the role of a translator in transcribing the six recorded outputs of the machine-event generator into sequences of six-digit binary number representations. Unambiguous decoding was obtained based on recordings of five utterances for each of ten words (the digits, 'zero' to 'nine') by each of four different speakers. The report discusses theoretical foundations for the decoder, design principles for the short-time spectrum and machine-event generators, and bases for the computation of significant sub-sequences from transitions of the machine events. Appendices describe the method for determining the distribution of the bandpass filters and for computing filter bandwidths. The method suggests a feasible approach to practical speech recognition devices. (Author)

AD-641 187 **Field 9D, 9E**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A METHOD FOR CONSTRUCTING CIRCUIT CODES.
Memo. rept.,
by Victor Klee. Oct 66, 26p RM-5112-PR
Contract AF 49(638)-1700, Grant NSF-GP-3579

Descriptors: (*Coding, Theory), Reliability (Electronics), Circuits, Analog-to-digital converters, Binary arithmetic, Combinatorial analysis.

A d-dimensional circuit code of spread s is a simple circuit Q in the graph of the d-dimensional cube (0, 1)d such that any two vertices of Q differing in exactly r coordinates, with $r < s$, can be joined by a path formed from r edges of Q. Such codes are designed to introduce error detection into certain analog-to-digital conversion systems. Longer codes correspond to increased accuracy in determining the maximum length C (d, s) of d-dimensional circuit codes of spread s. This study contributes to the problem for even values of s by describing a method for combining a code of spread s with a suitably related code of spread s - 1 so as to produce a longer code of spread s. (Author)

AD-641 248 **Field 9D, 17B, 12B**
Not available from CFSTI.
Northwestern Univ., Evanston, Ill. Dept. of Electrical Engineering.
PROBABILISTIC FLOWS THROUGH A COMMUNICATION NETWORK.
Revised ed.,
by H. Frank, and S. L. Hakimi. 15 Mar 65, 3p
Grant AF-AFOSR-98-63
Proj. AF-9749
Task 974901
AFOSR-66-0207
Revision of manuscript submitted 20 Jul 64.
Availability: Published in IEEE Transactions on Circuit Theory vCT-12 n3 p413-4 Sep 1965.

Descriptors: (*Communication systems, *Networks), Probability, Operations research.

AD-641 266 **Field 9D, 17B, 12B**
Not available from CFSTI.
Northwestern Univ., Evanston, Ill. Technological Inst.
OPTIMUM DISTRIBUTION OF SWITCHING CENTERS IN A COMMUNICATION NETWORK AND SOME RELATED GRAPH THEORETIC PROBLEMS,
by S. L. Hakimi. 3 Aug 64, 16p
Grant AF-AFOSR-98-63
Proj. AF-9749
Task 974901
AFOSR-66-0209
Availability: Published in Operations Research v13 n3 p462-75 May/Jun 1965.

Descriptors: (*Communication systems, *Networks), (*Graphics, Theory), Optimization, Information theory, Operations research, Algebras.

The concept of a median in a weighted graph is generalized to a multimedian. Then, it is shown that the optimum distribution of p switching centers in a communication network is at a p-median of the corresponding weighted graph. The following related problem in highway networks is also considered: What is a minimum number of policemen that can be distributed in a highway network so that no one is farther away from a policeman than a given distance d. This problem is attacked by generating all vertex-coverings (externally stable sets) of a graph by means of a Boolean function defined over the vertices of a graph. Then this idea is extended to Boolean functions that generate all matchings, all factors, and all possible subgraphs of G with given degrees. (Author)

N66-30256 **Field 9D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE DESIGN OF NUMERICAL FILTERS FOR GEOMAGNETIC DATA ANALYSIS.
by K. W. Behannon, and N. F. Ness. Jul 66, 38p
NASA-TN-D-3341

Descriptors: *Diurnal variation, *Earth rotation, *Filter, *Geomagnetic field, Diurnal, Earth, Field, Geomagnetic, Geophysics, Magnetometer, Magnetosphere, Measurement, Numerical, Periodic, Rotation, Satellite, Time, Transient, Variation.

For abstract, see STAR 04 17.

AD-474 217 **See Field 9E**

AD-640 866 **See Field 12A**

AD-641 003 See Field 17B

AD-641 008 See Field 12A

AD-641 037 See Field 9B

AD-641 091 See Field 12A

9E. SUBSYSTEMS

AD-460 160 Field 9E
CFSTI Price: HC$4.00
Electronic Defense Lab., Electronic Systems-West Mountain View, Calif.
A COMPUTER PROGRAM FOR THE FREQUENCY ANALYSIS OF LINEAR ELECTRICAL NETWORKS.
Technical memo.,
by E. A. Huber, and Phyllis J. Grossberg. 30 Oct 64. 121p EDL-M752
Contract DA-36-039-AMC-03404 (E)

Descriptors: (*Electrical networks, Frequency), (*Frequency, Programming (Computers)), Linear systems, Equations.

Identifiers: Falen, Fortran, IBM 7040.

A computer program for performing frequency analysis of linear electrical networks with up to 40 nodes is described. The network is described to the program by a list of the types of elements, their node connections and their values. The frequency functions to be calculated are defined by choosing from a prepared set of equations and listing the variables to be used in these equations. Subroutines are used to describe the frequency functions and transistor models; these subroutines may be easily changed to describe models or functions not presently provided. The desired frequency functions are computed in the program by generating the admittance matrix and partially inverting it to obtain the voltages needed in the specified equations. (Author)

AD-474 217 Field 9E, 9D
CFSTI Prices: HC$3.00 MF$0.50
California Univ., Berkeley. Electronics Research Lab.
A GENERAL MATCHING THEORY AND APPLICATION TO TUNNEL DIODE AMPLIFIERS,
by Y. T. Chan, and E. S. Kuh. 17 Aug 65. 58p Rept. no. 65-23
Grant AF-AFOSR-139-65, NSF-GP-2684

Descriptors: (*Impedance matching, *Tunnel diodes), (*Amplifiers, Tunnel diodes), Theory, Broadband, Coupling circuits, Resistance (Electrical), Inductance, Gain, Stability, Bandwidth, Electrical impedance, Numerical analysis.

Youla's theory of broadband matching is generalized to include both passive and active 1-port load impedances. The design philosophy of lossless coupling networks for an active load is different from that of a passive load; however, the design theory is quite similar. The theory is illustrated in a detailed example with a tunnel diode as the active load. Both series resistance and inductance are used in the equivalent circuit representation. New results in terms of theoretical limitation on gin-bandwidth and a sufficient condition for potential stability are obtained. (Author)

AD-640 542 Field 9E, 12A
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
THE EXISTENCE AND GENERATION OF A HAMILTON CIRCUIT IN A TREE GRAPH,
by Takahiko Kamae. Sep 66. 45p R-319
Contract DA-28-043-AMC-00073 (E)
Proj. DA-20014501B31F

Descriptors: (*Topology, *Circuits), Electrical networks, Graphics.

The existence of a Hamilton circuit in a tree graph was first proved by R. L. Cummins in his Ph. D. thesis at the University of Illinois. However, the proof involves complicated procedures, and it is hard to apply it to the generation of all the trees in a given graph. The new proof, which is straightforward and concise, is given in this paper. This proof is constructive and applicable to the generation of all the trees in a given graph. A general procedure for obtaining a Hamilton circuit in a tree graph is shown. By applying this procedure, all the trees in a graph with 5 vertices and 8 edges are generated in an example. The procedure is of recursive nature and hence suitable for computation by a digital computer. (Author)

AD-640 584 Field 9E, 9A
CFSTI Prices: HC$3.00 MF$0.50
Air Force Armament Lab., Eglin AFB, Fla.
INVESTIGATION OF A TUNNEL DIODE OSCILLATOR AS AN ANALOG TO DIGITAL CHARGE CONVERTER.
Thesis,
by Vito William Marinelli. Oct 66. 56p AFATL-TR-66-88

Descriptors: (*Tunnel diodes, *Analog-to-digital converters), Oscillators, Gallium alloys, Arsenic alloys.

Identifiers: Gallium arsenide.

A 10 ma gallium arsenide tunnel diode has been used as an oscillator. The oscillator power supply voltage is adjusted so that the diode is in its low voltage state and cannot oscillate. An amount of charge Q is introduced into the circuit and if this charge is great enough, the circuit oscillates for a short time. The charge Q is introduced in one of two ways; the capacitance is kept constant and the voltage is increased or the voltage is kept constant and the capacitance is varied. It was found that when the charge is introduced by keeping the voltage constant and varying the capacitance, a linear relationship exists between the charge Q and the number of oscillations. However, when the capacitance is constant and the voltage is varied, the circuit reaches a point where an increase in Q causes no increase in the number of oscillations. (Author)

AD-640 659 Field 9E
CFSTI Prices: HC$1.00 MF$0.50
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
SELF-PHASING RADIO TELESCOPE ARRAYS,
by F. D. Drake. Sep 64. 7p CRSR-179
Contract AF 49 (638)-1156

Descriptors: (*Radio telescopes, Phased arrays), Design, Antenna radiation patterns.

A system which produces a self-phasing radio telescope array is shown. The system has features which permit its application to very extended arrays, and provide for multiple beams. It consists of a reference antenna and associated electronics, to whose signal output all other antenna outputs will be compared and phased. One such slave element is shown. A superheterodyne circuit is shown; although this is not necessary, it is by far the simplest to construct at present. The phase adjustment of the slave element is performed in a standard phase locked loop in which the IF outputs of the references and slave element are compared in a phase detector. The output of this phase detector is a varying DC voltage which is used to control the phase and frequency of a voltage controlled oscillator (VCO) which is the local oscillator of the slave element receiver. The VCO can be similar to the usual crystal controlled oscillator, in which the control voltage is applied to the crystal to pull the frequency and phase as required. In operation, the phase locked loop works upon the VCO so as to insure cophasing of the IF signals of reference and slave element at the central comparison point, which would normally be the central data gathering point of the array.

AD-640 665 Field 9E
CFSTI Prices: HC$3.00 MF$0.75
Cruft Lab., Harvard Univ., Cambridge, Mass.
A THEORETICAL STUDY OF DIELECTRIC-COATED CYLINDRICAL ANTENNAS.
Technical rept.,
by Chung-Yu Ting. Jul 66. 87p TR-506
Contract Nonr-1866 (32)
Proj. NR-371-016

Descriptors: (*Antennas, Dielectrics), Wave transmission, Coatings, Cylindrical bodies, Theory, Rods, Antenna radiation patterns, Encapsulation, Integral transforms, Approximation (Mathematics).

A cylindrical antenna, either infinite or finite, which is imbedded in a concentric dielectric rod has been investigated by employing a rigorous formulation. The infinite case is solved easily by a Fourier transform method; the finite case is solved first by a numerical method, then by a two-term approximation. The mathematical analysis is intricate, nevertheless, the results obtained for the finite antenna are as simple as for the free-space dipole. It is shown in both cases that the input conductances are larger than for the corresponding free-space antennas, and the field patterns tend to be more broadside. The method is applicable regardless of the thicknesses of the antennas and the dielectric rod. This study is limited to thin antennas in rather thick dielectric cylinders. However, the dielectric rod is still not thick enough to support a T. M. mode. (Author)

AD-640 670 Field 9E
CFSTI Prices: HC$2.00 MF$0.50
Computer Control Co., Inc., Framingham, Mass.
EVALUATION OF FLIP/CHIP INTEGRATED CIRCUIT INTERCONNECTIONS.
Interim development rept., 14 Oct 65-14 Jan 66. 14 Feb 66. 41p
Contract NObsr-95052
Proj. SR-008-0303
Task 9624

Descriptors: (*Integrated circuits, Circuit interconnections), Ultrasonic welding, Substrates, Modules (Electronics), Design, Manufacturing methods.

The initial study of some of the basic constraints to be applied to Flip/Chip modules has been completed. Masks for the preparation of experimental samples have been designed and sample substrates and chips are being prepared. Ultrasonic welding equipment has been installed and is operational. A few samples have been bonded. (Author)

AD-640 710 Field 9E, 13I
CFSTI Prices: HC$2.00 MF$0.50
Piezo Technology Inc., Orlando, Fla.
PEM FOR FILTER, QUARTZ CRYSTAL 112Mc. TYPE EL-FR (X-2) AND CRYSTAL UNIT, FILTER, QUARTZ TYPES CR (XM-64)/U AND CR (XM-65)/U.
Quarterly progress rept. no. 5, 1 May-30 Jul 66.
by R. B. Angove, and R. J. Pruitt Jr. 30 Jul 66. 40p
Contract DA-36-039-AMC-03638 (E)
See also AD-635 123.

Descriptors: (*Crystal filters, Manufacturing methods), (*Quartz resonators, Crystal filters), Quartz, Very high frequency, Band-pass filters, Narrowband, Performance (Engineering), Calibration.

Conclusions: The shape factor of the first two sets of filter engineering samples deviates significantly from the requirement. This probably results from stray reactances and crystal static resistance but will be investigated more fully during the next quarter. It is unlikely, however, that the shape factor can be significantly improved from the performance of the second set of filters. A satisfactory method of final frequency calibration of the CR (XM-65)/U units has been developed and some progress has been made toward lowering static resistance. (Author)

AD-640 742 Field 9E
Not available from CFSTI.
Army Electronics Command, Fort Monmouth, N. J. Electronics Components Lab.
FREQUENCY CONTROL DEVELOPMENTS,
by Arthur D. Ballato, and Robert V. McKnight. 1966, 5p
Presented at the Annual Frequency Control Symposium (20th), Atlantic City, N. J., 19-21 Apr 66.
Availability: Published in Physics Today v19 n8 5p Aug 1966.

Descriptors: (*Frequency, Control systems), Crystals, Vibration, Theory, Crystal filters, Resonators, Standards, Atomic clocks, Masers, Cesium belectron tubes, Performance (Engineering), Frequency stabilizers.

With understanding of energy trapping, vibration theory is reducing crystal-filter design to handbook form. Masers and beam tubes too are enjoying developments giving frequency stabilities of one part in 10 to the 14th power. (Author)

AD-640 752 Field 9E
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
THE EFFECTS OF DISPERSION IN LINEAR ARRAYS.
Memorandum rept.,
by C. B. Sharpe, and R. B. Crane. Oct 66, 18p
Rept. no. 6400-87-R
Contract DA-28-043-AMC-00013 (E)
Proj. DA-1P6-20801-A-175
Task 1P6-20801-A-175-03
ECOM-00013-87
Rept. on Proj. Michigan.

Descriptors: (*Antenna arrays, Linear systems), Waveguides, Scattering, Antenna radiation patterns, Bandwidth, Gain.

The effects of waveguide dispersion on the radiation pattern and directivity of series-fed, linear arrays are investigated, and an expression for the directive gain of such arrays is derived. The directivity and radiation patterns for typical arrays are presented for various values of signal bandwidths and waveguide cutoff frequencies. It is shown that the detrimental effects of dispersion on both directivity and beamwidth are substantial when the signal bandwidth is comparable to the nominal bandwidth of the array. (Author)

AD-640 821 Field 9E, 18H, 9B
CFSTI Prices: HC$4.00 MF$1.00
Nortronics, Newbury Park, Calif. Applied Research Dept.
TRANSIENT RADIATION VULNERABILITY OF MONOLITHIC BINARY CIRCUITS.
Final rept., Nov 65-Jun 66,
by William W. Chang, Edward J. Steele, James P. Raymond, Elliott G. Lawrence, and James R. Coss. Sep 66, 148p NARD-66-45-R
Contract AF 30 (602)-3589
Proj. AF-5710
RADC-TR-66-433

Descriptors: (*Integrated circuits, Radiation damage), Computer logic, Transistors, Semiconductors, Failure (Electronics).

An investigation was made to experimentally determine the pulsed ionizing radiation vulnerability of critical computer binary circuits, and study basic radiation-induced failure mechanisms. The test specimens were three bipolar transistor circuits fabricated by the monolithic integrated circuit technique, and one metal-oxide-semiconductor (MOS) integrated circuit. Experimental studies consisted of determining electrical circuit performance, and induced transient responses when exposed in a pulse ionizing radiation environment. Failure mechanisms were related analytically, where possible, to the characteristics of the circuit, and to electrical parameter degradation. Two failure modes were observed in the binary circuits. Transient response at circuit logic outputs was of sufficient magnitude to temporarily obscure the logic state of the circuit. Additionally, the intense radiation environment was sufficient to cause a radiation-induced change-of-state, with a permanent loss of stored information in the circuit. Electrical parameter degradation of the bipolar transistor circuits was insignificant after exposure to approximately 10,000 rads (Si). However, significant variations in circuit performance were observed for the MOS circuits when exposed to the same ionizing radiation intensities. (Author)

AD-640 898 Field 9E
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
THE BACKFIRE ANTENNA: A QUALITATIVE APPROACH TO ITS DESIGN.
Instrumentation papers,
by Francis J. Zucker. 17 May 65, 6p AFCRL-IP-97, AFCRL-66-317
Proj. AF-5635
Task 563502
Availability: Published in Proceedings of the IEEE p746-7 Jul 1965.

Descriptors: (*Antennas, Design), Reflectors, Gain.

Identifiers: Backfire antennas.

The report gives design data for backfire antennas and describes how the optimum parameters for maximum gain are obtained. (Author)

AD-640 914 Field 9E, 17I
CFSTI Prices: HC$1.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
HAYSTACK DISPLAY TRANSLATOR.
Technical note,
by S. B. Russell. 10 Oct 66, 22p TN-1966-24
Contract AF 19 (628)-5167
Proj. AF-649L
ESD-TR-66-453

Descriptors: (*Display systems, Antennas), Radar antennas, Radio telescopes, Computer logic.

Identifiers: Haystack pointing system.

The Haystack Display Translator provides decimal displays of the Haystack antenna azimuth and elevation position angles, command azimuth and elevation angles, azimuth and elevation bias angles, or alternately, azimuth and elevation center of scan angles, and EST and GMT displays. Each of the 19-bit binary angle inputs is multiplied by a scale factor, converted from binary to BCD, and stored for display. EST in BCD is stored for display and also converted to GMT and stored for display. (Author)

AD-640 924 Field 9E, 12A
Not available from CFSTI.
Illinois Univ., Urbana. Coordinated Science Lab.
ON CERTAIN RELAXATION OSCILLATIONS: ASYMPTOTIC SOLUTIONS,
by Peter J. Ponzo, and Nelson Wax. 23 Sep 64, 29p
Contract DA-28-043-AMC-00073 (E), Grant AF-AFOSR-931-65
Proj. AF-9749
Task 974901
AFOSR-66-0038
Availability: Published in J. Soc. Indust. Appl. Math v13 n3 p740-66 Sep 1965.

Descriptors: (*Relaxation oscillators, Mathematical analysis), Asymptotic series.

AD-640 933 Field 9E, 9A
CFSTI Prices: HC$4.00 MF$0.75
Naval Avionics Facility, Indianapolis, Ind.
EVALUATION OF THIN-FILM RESISTORS AND CROSSOVERS.
Final rept.,
by John Paulus. 15 Oct 66, 106p NAFI-TR-835

Descriptors: (*Resistors, Films), (*Circuits, Films), Vapor plating, Vacuum apparatus, Substrates, Glass, Silicon compounds, Monoxides, Cermets, Copper, Chromium, Life expectancy, Reliability (Electronics), Noise (Radio), Failure (Electronics).

The report describes various experiments performed on thin-film resistor and crossover networks which were vacuum deposited on glass substrates using silicon monoxide, cermet, copper, and chromium deposition materials. Test results are discussed from both an engineering and statistical point of view. (Author)

AD-640 934 Field 9E
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
ELECTRONIC POLARIZATION CONTROL.
Final engineering rept., 7 Feb 64-31 Mar 66.
31 Mar 66, 17p Rept. no. 1804-7
Contract NOw-64-0293

Descriptors: (*Polarization, Control systems), (*Microwaves, Polarization), Radomes, Errors, Boresighting, Phase shifters, Scattering, Waveguides, Performance (Engineering), Radar antennas, Antenna components, Antennas, Coupline circuits, Design.

The accomplishments of a research program on polarization aspects of microwave antennas are summarized. Two basic areas were investigated: i.e., electronic polarization control techniques and the effect of polarization control on radome boresight error. Analyses were developed for determining boresight error with two-dimensional radome geometries; and methods of optimum radome design were determined. Two polarization control devices and an electronic phase shifter for use with these devices were tested. (Author)

AD-640 972 Field 9E, 20N
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
STUDYING REFLECTING PROPERTIES OF CERTAIN SYSTEMS, HAVING A PERIODIC STRUCTURE,
by A. A. Semenov, and D. K. Kvavadze. 12 Apr 66, 17p FTD-TT-65-1273
TT-66-62508
Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya Matematiki, Mekhaniki, Astronomii, Fiziki, Khimii (USSR), v13 n1 p107-14 1958.

Descriptors: (*Electromagnetic wave reflections, *Antennas), Metals, Surfaces, USSR.

AD-641 001 Field 9E
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE BANDWIDTH OF THE ABRUPT-JUNCTION VARACTOR FREQUENCY DOUBLER.
Revised ed.,
by Alfred I. Grayzel. 19 Oct 65, 8p JA-2355
Contract AF 19 (628)-5167
ESD-TR-66-369
Revision of manuscript submitted 6 Jun 64.
Availability: Published in IEEE Transactions on Circuit Theroy vCT13 n1 p52-8 Mar 1966.

Descriptors: (*Bandwidth, *Frequency multipliers), Varactor diodes, Harmonic generators, Broadband.

The bandwidth of the nonoverdriven abrupt-junction varactor doubler is considered, where the bandwidth is defined as that range of frequencies over which the ratio of the output power to available power exceeds some constant T min, when driven by a source whose available power remains constant as the frequency is varied. Upper bounds

on the bandwidth as a function of T min are derived for the lossless case. Networks are given which yield large bandwidths and their performance compared with the upper bound. Their performance is also given in the presence of loss. (Author)

AD-641 010 **Field 9E**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
TEMPERATURE STABILIZATION OF UNSATURATED MICROWAVE FERRITE DEVICES,
by Ernest Stern, and William J. Ince. Nov 65, 3p MS-1473
Contracts AF 19 (628)-5167, ARPA order-512
ESD-TR-66-221
Availability: Published in Journal of Applied Physics v37 n3 p1075-6 Mar 1 1966.

Descriptors: (*Microwave equipment, Ferromagnetic materials), Stabilization, Temperature, Phase shifters, Circuits, Hysteresis.

Identifiers: Ferrites (Electronics).

A technique utilizing a composite magnetic series circuit is described wherein the flux density of unsaturated microwave ferrite is maintained constant in spite of large changes in microwave ferrite saturation magnetization, coercive force, and hysteresis loop shape. The composite circuit consists of a driver, a flux limiter, and a microwave ferrite. The driver supplies the necessary mmf to maintain constant flux level in the circuit throughout the temperature range. The flux limiter, a particularly stable ferrite material, establishes the constant flux level. The driver and flux limiter may lie outside the microwave region and may in consequence possess indifferent microwave properties. A simple design procedure is described for determining the driver and flux limiter dimensions. Special attention is given to the effects of air gaps and leakage fluxes which tend to reduce the effectiveness of the technique. A remanence phase shifter is described which suffers a 16% loss of phase shift as a result of an 80C rise of temperature. By the application of composite circuit techniques, the temperature sensitivity was reduced to less than 2 1/2% over the same temperature range. (Author)

AD-641 012 **Field 9E**
CFSTI Prices: HC$2.00 MF$0.50
Harry Diamond Labs., Washington, D. C.
A FLUSH-MOUNTED COMPOSITE RADOME ANTENNA SYSTEM,
by Howard S. Jones Jr. Aug 66, 31p TR-1327
Projs. DA-1P523801A300, HDL-26300

Descriptors: (*Radomes, Dielectrics), Design, Slot antennas, Radar antennas, Antenna radiation patterns, Airborne, Waveguides.

An integrated radome-antenna structure for use on aircraft, space vehicles, or guided missiles is described. The design principle employed fully utilizes the dielectric material from which the radome is fabricated. The elemental antenna is a slotted array, designed from metallic-plated dielectric-loaded waveguide, which is an integral part of the radome. The antenna array of the system has a one-way gain of approximately 8 db, 20 db side lobe suppression, and a voltage standing wave ratio of less than 1.5 measured over a 10 percent bandwidth. Theoretical considerations, design techniques, and material characteristics are discussed. Also included are electrical performance characteristics and illustrations of a complete radome-antenna system. The antennas occupy practically no additional volume in the structure and can be designed to give very good performance in several frequency bands. (Author)

AD-641 086 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aero Mechanics Dept.
UNIVERSAL ENCODER TESTING SYSTEM.
Final rept.,
by Eric A. Alfonsi, and J. M. K. Bergey. 9 Sep 66, 19p NADC-AM-6646
Task MX6/X007-02-02

Descriptors: (*Analog-to-digital converters, *Test sets), Automatic, Computer logic, Digital systems, Performance (Engineering), Test equipment.

The Universal Encoder Tester (UNET) was developed to provide the Navy with an automatic testing system capable of fully evaluating Analog-to-Digital (A/D) Converters. Modifications were undertaken to improve the performance of the system to provide for a simplification of the timing controls and an improved error detection routine. Substantial improvements have been made to increase the functional capabilities of the machine. (Author)

AD-641 110 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A PHASE DEMODULATOR OF THE SECOND HARMONIC WITH WIDTH MODULATION,
by V. Ju. Vorobkevic, and I. S. Daniljuk. 30 Mar 66, 16p FTD-TT-65-1616
TT-66-62521
Unedited rough draft trans. of Slaboproudy Obzor (Czechoslovakia) v25 n1 p21-4 1964.

Descriptors: (*Demodulators, Phase modulation), Czechoslovakia, Power, Gain, Performance (Engineering).

The properties of a phase demodulator of the second harmonic with width modulation are investigated. The demodulator considered here needs only small signal power with a sufficient zero stability and yields a high power gain. The most important results of the theoretical investigations and of the experimental verification of the demodulator response (transfer coefficient, zero point stability, dynamic properties) are stated. (Author)

AD-641 197 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
A FIRST ORDER APPROACH TO RADOME BORESIGHT ANALYSIS AND DESIGN,
by R. E. Van Doeren. 15 Mar 66, 79p Rept. no. 1804-6
Contract NOw-64-0293
See also AD-623 656.

Descriptors: (*Radomes, Wave transmission), Design, Polarization, Corrections, Errors, Radar antennas, Monopulse radar, Graphics.

A simplified first-order theory of radome boresight error is derived and applied to prediction and design problems. Reasonable predictive results are obtained for radomes with known boresight error. The dependence of boresight error on the derivatives of IPD and absolute value of T with respect to incidence angle is shown and the significance of polarization in light of the theory is discussed. Polarization control is shown to reduce boresight error when used with an appropriate radome wall design. The possibility of a 'cancellation' design for a radome, wherein the errors due to phase tapering and to differential attenuation tend to cancel each other is pointed out. The concept of artificially introduced loss to achieve such cancellation is discussed. A design example is included. Radome design curves giving absolute value of T squared, IPD, d/d theta (IPD), and d/d theta absolute value of T for several important radome wall structures are also included. (Author)

AD-641 250 **Field 9E, 9A**
Not available from CFSTI.
Northwestern Univ., Evanston, Ill. Dept. of Electrical Engineering.
REALIZATION OF THE IMMITTANCE MATRICES OF THREE-TERMINAL NETWORKS WITH TWO KINDS OF ELEMENTS.
Revised ed.,
by K. C. Wang, and S. S. Yau. 21 Mar 65, 4p
Grant AF-AFOSR-98-63
Proj. AF-9749
Task 974901
AFOSR-66-0205
Revision of manuscript submitted 6 Jan 64.
Availability: Published in IEEE Transactions on Circuit Theory vCT-12 n3 p438-9 Sep 1965.

Descriptors: (*Electrical networks, Synthesis), Electric terminals, Admittance, Electrical impedance, Matrix algebra.

Recently, Lucal and Ozaki considered the synthesis of three-terminal networks with two kinds of elements. Since they are concerned with the exact realization of the transfer function and the two driving-point functions, their methods can be applied only to very restricted cases. This note presents a synthesis technique which can realize a large class of three-terminal short-circuit admittance matrices with two kinds of elements.

AD-641 253 **Field 9E, 9A**
Not avilable from CFSTI.
Northwestern Univ., Evanston, Ill. Dept. of Electrical Engineering.
SYNTHESIS OF RLC TWO-PORT NETWORKS.
Revised ed.,
by K. C. Wang, and S. S. Yau. 3 Jun 64, 4p
Grant AF-AFOSR-98-63
Proj. AF-9749
Task 974901
AFOSR-66-0206
Revision of manuscript submitted 6 Jan 64.
Availability: Published in IEEE Transactions on Circuit Theory vCT-12 n3 p437-8 Sep 1965.

Descriptors: (*Electrical networks, Synthesis), Resistance (Electrical), Electrical impedance, Matrix algebra.

Identifiers: RLC networks.

Recently, Forte found that the positive-real condition is sufficient for the realizability of a symmetric matrix of order 2 as the immittance matrix of an RLC two-port network if the transfer function is realized within a constant multiplier. However, his realization technique requires approximation method and hence is quite complicated. In this correspondence, an alternative realization method which does not require any approximation technique is discussed.

N66-30188 **Field 9E**
CFSTI Prices HC$3.00 MF$0.50
Hughes Aircraft Co., Fullerton, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Ground Systems Group.
MODIFICATION OF DSIF SCM FEEDS FINAL REPORT, 11 JUN. 1963 - 7 JAN. 1964.
11 Jan 64, 58p NASA-CR-76123
Contracts NAS7-100, JPL-950639
Prepared For Jpl

Descriptors: *Cassegrain antenna, *Deep space instrumentation facility (dsif), *Feed system, *Horn antenna, *Tracking antenna, Antenna, Feed, Guide, Horn, Monopulse, Pattern, Rectangle, Shape, System, Tracking.

For abstract, see STAR 04 17.

PB-173 346 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Electric Power Branch.
EXPLORATORY ANALOG COMPUTER STUDIES OF SYSTEM DAMPING THROUGH SUPPLEMENTARY CONTROL OF EXCITATION IN COMPLEX SYSTEM CONFIGURATIONS,
by F. R. Schleif, and G. E. Martin. 1 Aug 66, 17p EP-18

Descriptors: (*Electrical engineering, Electrical networks), (*Electrical networks, Damping), Configuration, Power plants (Establishments), Excitation, Generators, Stability, Frequency, Phase (Electronics), Analog computers.

Influence of supplementary control of excitation as a function of speed was explored through analog studies of several system configurations. In each configuration studied, this control proved to be beneficial. System configurations considered in this study are more complex than the signle machine to infinite bus configuration previously studied in more detail. Basic characteristics are listed for the simplest possible system representation which would incorporate all essential elements and control capability. System configuration, schematic, analog diagram, and readout from the analog are shown for 3 different systems. (Author)

AD-640 587 **See Field 17I**

AD-640 931 **See Field 17B**

AD-641 052 **See Field 9B**

AD-641 187 **See Field 9D**

9F. TELEMETRY

AD-640 596 **Field 9F, 4A**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
VHF AND UHF HIGH-G TELEMETRY INSTRUMENTATION FOR HARP VEHICLES.
Memorandum rept.,
by W. H. Mermagen, W. J. Cruickshank, and F. Vrataric. May 66, 34p BRL-MR-1768
Proj. RDT/E-1A011001B021
Prepared in cooperation with Harry Diamond Labs., Washington, D. C.

Descriptors: (*Telemeter systems, Rocket assisted projectiles), Gun launched, High altitude, Very high frequency, Acceleration, Ultrahigh frequency, Reliability (Electronics), Atmospheric sounding.

Identifiers: HARP.

Telemetry systems capable of surviving gun-launched accelerations in the order of 60,000 g have been developed for the High Altitude Research Program (HARP). Such telemetry systems have been used to provide data on the flight dynamics of gun-launched vehicles as well as measurements of upper atmospheric phenomena. The results of measurements of electron densities and temperatures in the upper atmosphere are presented and discussed as examples of the data gathering capability of the HARP program. Vehicle roll rates and pitch-yaw frequencies have been measured during high altitude flights. The results are presented and some anomalous examples are discussed. It has been shown that the technique of using guns to launch instrumented payloads into the upper atmosphere is both practical and useful. Moreover, the inclusion of on-board instruments to observe the dynamical behavior of flight vehicles provides a useful tool for aerodynamic research in the real atmosphere. (Author)

N66-30032 **Field 9F**
CFSTI Prices HC$1.00 MF$0.50
Defence Research Telecommunications Establishment, Ottawa (Ontario). Electronics Lab.
SIGNAL PROCESSING FOR THE ALOUETTE SATELLITES.
by G. T. Lake. May 66, 18p DRTE-1161

Descriptors: *Alouette satellite, *Data processing, *Signal processing, Chart, Data, Equipment, Film, Ground, Ionogram, Magnetic, Processing, Recording, Satellite, Signal, Station, Tape.

For abstract, see STAR 04 17.

N66-30317 **Field 9F**
CFSTI Prices HC$6.00 MF$2.25
Research Triangle Inst., Durham, N. C.
AN ANALYTICAL INVESTIGATION OF RADIO FREQUENCY INTERFERENCE AND ACQUISITION PROBABILITY FOR A COMBINATION RADAR AND TELEMETRY SYSTEM FINAL REPORT, MAY 14, 1965 - MAY 31, 1965.
31 May 66, 211p NASA-CR-66097, TRR-29
Contract NAS1-5065

Descriptors: *Radar tracking, *Radio interference, *Target acquisition *Telemetry, Acquisition, Antenna, Combination, Computer, Cross section, Detection, Frequency, Interference, Probability, Program, Pulse, Radar, Radio, Receiver, Target, Tracking, Transmission, Uncertainty, X-band.

For abstract, see STAR 04 17.

N66-30329 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPUTED RADIATION PATTERNS FOR A DUAL-PLANE AMPLITUDE-SENSING MONOPULSE ANTENNA USING AN ELECTRONIC BORESIGHT SCANNING TECHNIQUE.
by A. D. Elia, and R. F. Schmidt. Feb 66, 33p NASA-TM-X-55506, X-525-66-84

Descriptors: *Antenna field, *Monopulse antenna, *Radar antenna, *Radiation field, *Scanning device, Amplitude, Antenna, Boresight, Computation, Device, Electronic, Field, Monopulse, Pattern, Radar, Radiation, Scanning, Sensing.

For abstract, see STAR 04 17.

N66-30335 **Field 9F**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE OUTPUT AUTOCORRELATION FUNCTION AND POWER SPECTRAL DENSITY OF A DIODE FREQUENCY CONVERTER.
by L. J. Ippolito. Mar 66, 99p NASA-TM-X-55512, X-733-66-113

Descriptors: *Autocorrelation, *Correlation function, *Current density, *Diode, *Frequency converter, *Power spectrum, Converter, Correlation, Current, Density, Frequency, Function, Input, Noise, Output, Power, Signal, Spectral, Spectrum.

For abstract, see STAR 04 17.

N66-30362 **Field 9F**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A FOCUS SPOILING RETRODIRECTIVE MODULATOR.
by M. W. Fitzmaurice. May 66, 92p NASA-TM-X-55539, X-524-66-246

Descriptors: *Communication system, *Laser, *Optical modulation, Bandwidth, Communication, Frequency, Ground, Modulation, Modulator, Optical, Piezoelectricity, Response, Retrodirecting, Satellite, System, Transducer.

For abstract, see STAR 04 17.

N66-30363 **Field 9F**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md. Stanford Univ., Calif.
A CHAIN MATRIX ANALYSIS OF AN ELECTRONIC BORESIGHT SCANNING TECHNIQUE FOR A DUAL-PLANE AMPLITUDE-SENSING MONOPULSE ANTENNA.
by A. D. Elia, and R. F. Schmidt. 19 Jul 65, 59p NASA-TM-X-55540, X-525-65-300

Descriptors: *Matrix analysis, *Monopulse antenna, *Scanning, Amplitude, Analysis, Antenna, Boresight, Chain, Circuit, Computer, Coordinate, Difference, Dual, Electronic, Matrix, Monopulse, Pattern, Plane, Scattering, Sensing, Sum, Technique, Transfer.

For abstract, see STAR 04 17.

N66-30392 **Field 9F**
CFSTI Prices HC$3.00 MF$0.75
Auburn Research Foundation, Inc., Ala.
AN ANALYTICAL EVALUATION OF THE MILLS CROSS AND THE TWO-DIMENSIONAL MATRIX ANTENNA ARRAY TECHNICAL REPORT NO. 4.
by H. M. Summer. 15 May 64, 67p NASA-CR-76158
Contract NAS8-5231

Descriptors: *Antenna field, *Directional antenna, *Field strength, *Slot antenna, Analysis, Antenna, Cross, Direction, Directivity, Element, Field, Gain, Intensity, Matrix, Pattern, Scanning, Sidelobe, Slot, Strength.

For abstract, see STAR 04 17.

N66-30393 **Field 9F**
CFSTI Prices HC$4.00 MF$0.75
Auburn Research Foundation, Inc., Ala.
AROD REAL TIME DATA EXTRAPOLATION TECHNICAL REPORT NO. 5.
by H. M. Summer. 14 Jul 64, 107p NASA-CR-76157
Contract NAS8-5231

Descriptors: *Data processing, *Radio signal, *Real time, *Spacecraft tracking, *Tracking system, Continuous, Data, Extrapolation, Processing, Radio, Real, Signal, Spacecraft, System, Time, Tracking, Wave.

For abstract, see STAR 04 17.

N66-30401 **Field 9F**
CFSTI Prices HC$7.41 MF$2.25
National Engineering Science Co., Pasadena, Calif.
RESEARCH STUDY OF SOME RAM ANTENNAS FINAL REPORT, 18 NOV. 1964 - 18 JUN. 1965.
by L. Butler, P. Gilon, H. Hodara, C. M. Knop, and A. V. Love. Jun 65, 441p NASA-CR-66103, SN-226
Contract NAS1-4623

Descriptors: *Antenna array, *Impedance measurement, *Waveguide, Admittance, Antenna, Array, Circular, Coating, Cylinder, Dielectric, Feed, Gap, Impedance, Input, Measurement, Omnidirectional, Pattern, Radiation, Shunt, Single, Slot.

For abstract, see STAR 04 17.

N66-30610 **Field 9F**
CFSTI Prices HC$4.00 MF$0.75
Wolf Research And Development Corp., Bladensburg, Md. Applied Sciences Dept.
GEOS PRE-PROCESSING REPORT.
by R. L. Brooks, E. Hyman, and S. J. Moss. Apr 66, 119p NASA-CR-76228
Contract NAS5-9756

Descriptors: *Data acquisition, *Geodetic satellite, *Instrumentation, *Tracking system, Acquisition, Calibration, Camera, Data, Doppler effect, Electronic, Error, Expériment, Geodesy, Laser, Minitrack, Mots, Optical, Procedure, Range, Rate, Reduction, Satellite, System, Tracking.

For abstract, see STAR 04 17.

N66-30767 Field 9F
CFSTI Prices HC$3.00 MF$0.75
Purdue Univ., Lafayette, Ind. Electronic Systems Research Lab.
JOINTLY OPTIMUM WAVEFORMS AND RECEIVERS FOR CHANNELS WITH MEMORY.
by J. C. Hancock, and E. A. Quincy. Apr 66, 86p NASA-CR-76288, TR-EE66-7
Grant NSG-553, Contract NSF GP-2898

Descriptors: *Channel flow, *Error, *Memory, *Optimal control, Average, Channel, Control, Curve, Eigenfunction, Flow, Impulse, Interference, Joint, Minimization, Noise, Optimal, Optimum, Probability, Receiver, Response, Set, Signal, Structure, Transmission, Waveform, Zero.

For abstract, see STAR 04 17.

N66-30796 Field 9F
CFSTI Prices HC$1.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
THEORETICAL AND EXPERIMENTAL STUDIES OF ANTENNAS FOR REFLECTOMETER APPLICATION SEMIANNUAL STATUS LETTER, 1 DEC. 1965 - 31 MAY 1966.
6 Jun 66, 9p NASA-CR-76328
Contract NGR-36-008-048

Descriptors: *Antenna, *Reflectometer, Admittance, Aperture, Circular, Coefficient, Dielectric, Metal, Parallel, Plate, Radiation, Reflection, Slab, Waveguide.

For abstract, see STAR 04 17.

N66-30850 Field 9F
CFSTI Prices HC$3.00 MF$0.75
Auburn Research Foundation, Inc., Ala.
AN INVESTIGATION OF THE DESIGN CRITERION FOR A PHASE STABILITY STUDY SYSTEM OF VLF PROPAGATION OVER SHORT DISTANCES TECHNICAL REPORT NO. 9.
by E. R. Graf. 15 Dec 65, 85p NASA-CR-76356
Contract NAS8-5231

Descriptors: *Signal stabilization, *Very low frequency, Antenna, Capacitance, Characteristics, Conductivity, Design, Distance, Frequency, Measurement, Phase, Propagation, Radiation, Radiator, Short, Signal, Stability, Stabilization, Transmission, Very low.

For abstract, see STAR 04 17.

N66-31154 Field 9F
CFSTI Prices HC$4.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ASEE - UNIVERSITY OF MARYLAND - CATHOLIC UNIVERSITY NASA SUMMER FELLOWSHIP PROGRAM FIAL REPORT.
Jan 66, 107p NASA-TM-X-55504, X-520-66-3

Descriptors: *Digital technique, *Holography, *Laser, *Optical tracking, *Telemetry, *Tracking antenna, Accuracy, Antenna, Code, Control system, Design, Digital, Hamiltonian, Infrared, Modulation, Nuclear, Optical, Pulse, Spin, Technique, Tracking.

For abstract, see STAR 04 17.

N66-31216 Field 9F
CFSTI Prices HC$4.00 MF$1.00
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-39, VOLUME III FOR THE PERIOD MARCH 1 TO APRIL 30, 1966. THE DEEP SPACE NETWORK.
31 May 66, 132p NASA-CR-76379, JPL-SPS-37-39, VOL. III
Contract NAS7-100

Descriptors: *Deep space, *Digital communications system, *Spacecraft tracking, *Tracking station, Communications, Control, Data, Deep, Design, Digital, Doppler radar, Ground, Guidance, Handling, Model, Navigation, Network, Space, Spacecraft, Station, System, Tracking.

For abstract, see STAR 04 17.

N66-31217 Field 9F
CFSTI Prices HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
DESIGN, DEVELOPMENT, TESTING AND FLIGHT PERFORMANCE OF MARINER MARS PLANETARY SCAN SYSTEM.
by R. Y. Wong. 1 Jul 66, 69p NASA-CR-76380, JPL-TR-32-919
Contract NAS7-100

Descriptors: *Aircraft performance, *Mariner iv space probe, *Mars (planet), *Scanning device, Design, Detector, Device, Driver, Flight, Mars, Motor, Optics, Performance, Planetary, Preamplifier, Probe, Radiation, Scanning, Space, Testing, Tracking.

For abstract, see STAR 04 17.

N66-31223 Field 9F
CFSTI Prices HC$2.00 MF$0.50
Maryland Univ., College Park. Dept. Of Physics And Astronomy.
THE DESIGN OF LARGE STEERABLE ARRAYS USING VOLTAGE-VARIABLE CAPACITORS STATUS REPORT, OCT. 1, 1965 - MAR. 31, 1966.
by M. M. Komesaroff. Jun 66, 33p NASA-CR-76371
Grant NSG-615

Descriptors: *Antenna array, *Capacitor, *Radio astronomy, *Steerable antenna, Antenna, Array, Astronomy, Current, Design, Direct, Fast, Radio, Steering, Travel, Variable, Voltage, Wave.

For abstract, see STAR 04 17.

N66-3380 Field 9F
CFSTI Prices HC$2.00 MF$0.50
Lockheed Missiles And Space Co., Sunnyvale, Calif.
ADVANCED TELEMETRY SYSTEM WITH ADAPTIVE CAPABILITY FINAL TECHNICAL SUMMARY REPORT, 1 JUL. 1964 - 25 FEB. 1966.
by H. N. Massey. 25 Feb 66, 29p NASA-CR-76402, LMSC-669394
Contract NAS8-5110

Descriptors: *Adaptive control system, *Data processing, Adaptive, Amplitude, Capability, Circuit, Compressor, Control, Data, Design, Display, Flight, Ground, Logic, Monitor, Processing, Receiver, Recording, Space vehicle, System, Telemetry.

For abstract, see STAR 04 17.

N66-31898 Field 9F
CFSTI Prices HC$2.50 MF$0.75
Lockheed Missiles And Space Co., Sunnyvale, Calif.
THE FIRST EXPERIMENTAL FLIGHT PACKAGE OF AN ADVANCED TELEMETRY SYSTEM WITH ADAPTIVE CAPABILITY TECHNICAL SUMMARY REPORT, 1 JUL. 1963 - 15 FEB. 1965.
by J. A. Horton, H. N. Massey, and G. J. Whyte. 7 Feb 66, 85p NASA-CR-76515, LMSC-8-39-66-2
Contract NAS8-5110

Descriptors: *Environmental testing, *Function test, *Packaging, *Telemetry, Adaptive, Altitude, Capability, Design, Environment, Flight, Function, Heat transfer, High temperature, Mechanical, Shock, Test, Testing, Vibration.

For abstract, see STAR 04 17.

N66-32263 Field 9F
CFSTI Prices HC$2.00 MF$0.50
Rand Corp., Santa Monica, Calif.
THE EFFECTIVE DIRECTIVITY OF AN ISOTROPIC ANTENNA LOOKING DOWN THROUGH THE IONOSPHERE.
by R. L. Kirkwood. Jul 66, 31p NASA-CR-76671, RM-4949-NASA
Contract NASR-21

Descriptors: *Antenna, *Ionosphere, *Meteorological satellite, Critical, Directivity, Displacement, Effect, Electromagnetic, F layer, Horizontal, Isotropic, Low frequency, Meteorology, Radio, Ray, Satellite, Thunderstorm.

For abstract, see STAR 04 17.

N66-32613 Field 9F
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPRESSION OF VIDEO DATA BY ADAPTIVE NONLINEAR PREDICTION.
by J. A. Sciulli. Aug 66, 32p NASA-TN-D-3475

Descriptors: *Computer simulation, *Data compressor, *Predictor, *Video data, Adaptation, Cloud, Compression, Computer, Data, Encoding, Nonlinearity, Picture, Simulation, Survey, Technique, Theory, Tiros satellite, Video.

For abstract, see STAR 04 17.

N66-32617 Field 9F
CFSTI Prices HC$3.25 MF$1.00
Motorola, Inc., Scottsdale, Ariz. Military Electronics Div.
SPACE SUIT COMMUNICATION ANTENNA SYSTEM FINAL REPORT.
by R. S. Brazil. 30 Jun 66, 173p NASA-CR-65428
Contract NAS9-4174

Descriptors: *Antenna array, *Apollo project, *Astronaut, *Communication system, *Space suit, Antenna, Array, Communication, Configuration, Mount, Project, Scheme, Space, Suit, System.

For abstract, see STAR 04 17.

N66-32626 Field 9F
CFSTI Prices HC$1.00 MF$0.50
Advanced Technology Corp., Timonium, Md.
ANTENNA TRIPLEXER FINAL REPORT.
by R. J. Bauer. 16 Aug 65, 22p NASA-CR-65431
Contract NAS9-4602

Descriptors: *Antenna, *Communication system, *Multiplex transmission, Breadboard, Cable, Channel, Coaxial, Communication, Duplex, Electric, Foam, Frequency, Lightweight, Mechanical, Model, Multiplex, Personal, Potting, Specification, Switching, System, Transmission.

For abstract, see STAR 04 17.

N66-36781 Field 9F
CFSTI Prices HC$1.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
THE MUTUAL INTERPRETATION OF ACTIVE AND PASSIVE MICROWAVE SENSOR OUTPUTS.
by W. H. Peake, R. L. Riegler, and C. H. Shultz. 15 Jul 66, 20p NASA-CR-77987
Contract NSR-36-008-027
Its Rept.-1903-3

Descriptors: *Interpretation, *Microwave apparatus, *Sensor, Activity, Antenna, Apparatus, Correction, Microwave, Output, Passive, Pattern, Radar, Radiometry, Surface, Temperature, Terrain.

For abstract, see STAR 04 22.

N66-37148 **Field 9F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE BIASING EFFECT OF RANDOM BIT ERRORS ON BINARY TELEMETRY DATA.
by M. Pasternack. Oct 66, 12p NASA-TN-D-3481

Descriptors: *Data processing, *Pulse code modulation (pcm), *Random error, *Telemetry, Bias, Binary, Bit, Code, Data, Error, Mean, Modulation, Processing, Pulse, Random, Square.

For abstract, see STAR 04 22.

N66-37153 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A STATISTICAL DATA COMPRESSION TECHNIQUE.
by J. W. Snively Jr. Oct 66, 32p NASA-TN-D-3616

Descriptors: *Data compressor, *Histogram, *Mathematical model, *Satellite transmission, Area, Compression, Data, Mathematics, Measurement, Model, Ratio, Satellite, Summator, Transmission.

For abstract, see STAR 04 22.

N66-37225 **Field 9F**
CFSTI Prices HC$4.00 MF$0.75
Northeastern Univ., Boston, Mass.
RADIATION AND CURRENT PROPERTIES OF THE RESISTIVELY LOADED TRAVELING WAVE V-ANTENNA.
by S. S. Sandler. 15 Jul 66, 106p NASA-CR-78148
Grant NSG-355
Its Sci. Rept.-3

Descriptors: *Antenna, *Radio astronomy, *Traveling wave, Astronomy, Current, Load, Measurement, Property, Radiation, Radio, Rae satellite, Resistance, Satellite, Travel, Wave.

For abstract, see STAR 04 22.

N66-37270 **Field 9F**
CFSTI Prices HC$3.75 MF$1.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
TRACKING AND DATA ACQUISITION FOR RANGER MISSIONS VI-IX.
by N. A. Renzetti. 15 Sep 66, 275p NASA-CR-78163, JPL-TM-33-275
Contract NAS7-100

Descriptors: *Data acquisition, *Deep space instrumentation facility (dsif), *Ranger project, *Spacecraft tracking, Acquisition, Communications, Data, Dsif, Flight, Mission, Plan, Processing, Ranger satellite, Reduction, Spacecraft, Tracking, Transmission.

For abstract, see STAR 04 22.

N66-37322 **Field 9F**
CFSTI Prices HC$4.00 MF$1.00
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
PROCESSING SOLAR PROBE TRACKING DATA (SUNBLAZER).
by H. T. Doerer, and R. W. Langley. Aug 66, 117p NASA-CR-78160, CSR-T-66-5
Contract NASR-249

Descriptors: *Data processing, *Spacecraft tracking, *Sunblazer space probe, Azimuth, Coordinate, Earth, Error, Geometry, Inertial, Probe, Range, Solar, Station, System, Tracking.

For abstract, see STAR 04 22.

N66-37570 **Field 9F**
CFSTI Prices HC$3.00 MF$0.50
Illinois Univ., Urbana. Dept. Of Electrical Engineering.
THE RADIATION RESISTANCE OF A DIPOLE IN A UNIAXIAL MEDIUM SCIENTIFIC REPORT NO. 7.
by R. Mittra, and D. K. Waineo. Oct 66, 54p NASA-CR-78359
Grant NSG-395
Its Antenna Lab. Rept.- 66-14

Descriptors: *Dipole antenna, *Plasma, *Radiation resistance, Anisotropy, Field, Lossless, Medium, Poynting theorem, Radiation, Scaling, Uniaxial, Vector.

For abstract, see STAR 04 22.

N66-37571 **Field 9F**
CFSTI Prices HC$1.00 MF$0.50
Harvard Univ., Cambridge, Mass. Gordon Mc Kay Lab.
THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF ANTENNAS AND WAVES IN PLASMA SEMIANNUAL STATUS REPORT, MAR. 1 - AUG. 31, 1966.
by R. W. King. 1 Sep 66, 4p NASA-CR-78351
Contract NGR-22-007-056

Descriptors: *Dipole antenna, *Plasma, *Sound wave, Acoustic, Computer, Current, Distribution, Experiment, Immersion, Impedance, Line, Program, Transducer, Transmission.

For abstract, see STAR 04 22.

AD-640 902 **See Field 6C**

AD-640 977 **See Field 8A**

10. ENERGY CONVERSION (NON-PROPULSIVE)

N66-32606 **Field 10**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
POWER SYSTEMS RESEARCH AT MSFC.
1965, 58p NASA-TM-X-53419
Its Res. Achievements Rev., Ser. No. 14

Descriptors: *Electric motor, *Hydrox fuel cell, *Pegasus satellite, *Photovoltaic cell, *Space mission, *Spacecraft power supply, *Voltage regulator, *Zinc-silver oxide battery, Battery, Brushless, Cell, Current, Development, Direct, Electricity, Flight, Fuel, Motor, Oxide, Photovoltage, Power, Regulator, Rocket, Silver, Space, Switch, System, Transformer, Zinc.

For abstract, see STAR 04 17.

10A. CONVERSION TECHNIQUES

AD-454 777 **Field 10A**
CFSTI Price: HC$2.00
Magna Corp., Anaheim, Calif. Research and Development Div.
BIOCHEMICAL FUEL CELLS.
Quarterly progress rept. no. 9, 1 Jul-30 Sep 64.
by J. M. Brake. 30 Sep 64, 36p
Contract DA-36-039-sc-90866
Task 1G6-22001-A-053-04

Descriptors: (*Fuel cells, Biochemistry), (*Biochemistry, Fuel cells), (*Electrochemistry, Fuel cells), Power supplies, Bacteria, PH, Carboxylic acids, Carbohydrates, Metabolism, Temperature, Phosphates, Buffers, Alkaline cells, Polarographic analysis, Chemical analysis, Electrodes, Palladium.

The growth of Aeromonas formicans was studied as a function of pH. Best growth was obtained at pH 7 to 8. Natural organic ash was found to be useful in controlling pH. Temperatures in the range 20-41 C (68-106 F) did not appreciably affect the growth of the organism. A continuous culture cell was operated at 0.1 mA/sq.cm and an anode potential of -0.20 V vs. SCE for 4 days. (Author)

AD-456 740 **Field 10A, 21G**
CFSTI Price: HC$4.00
California Research Corp., Richmond.
AN EVALUATION OF FUEL CELL SYSTEMS FOR MILITARY VEHICLE PROPULSION AND PORTABLE ELECTRIC POWER GENERATION. PART 2.
Special rept.,
by Maurice J. Schlatter. 1 Feb 65, 118p SR-2
Contract DA-49-186-AMC-149 (D)

Descriptors: (*Fuel cells, Internal combustion engines), (*Power supplies, Internal combustion engines), (*Internal combustion engines, Fuel cells), Diesel engines, Fuel consumption, Steam, Hydrocarbons, Power, Performance (Engineering), Fuel oil, Alcohol, Methane, Ammonia, Hydrazine, Gasoline, Fuel systems, Electrolytes, Phosphoric acids, Tables, Mathematical analysis, High-temperature research, Combustion, Armed forces transportation, Electric power production, Electrochemistry.

Contents: Power densities and fuel consumption of gasoline and diesel engines; Power densities and fuel consumptions of present fuel cells; Heats of combustion of some fuels; Direct n-nonane - air fuel cell material balance calculations; Computer calculations, mathematical treatments; Theoretical product compositions from hydrocarbon steam reforming and shift equilibria; Theoretical carbon deposition limits in hydrocarbon steam reforming.

AD-460 795 **Field 10A**
CFSTI Price: HC$3.60
Magna Corp., Anaheim, Calif. Research and Development Div.
BIOCHEMICAL FUEL CELLS.
Quarterly progress rept. no. 10, 1 Oct-31 Dec 64.
31 Dec 64, 33p
Contract DA-36-039-sc-90866
Task 1C6-22001-A-053-04

Descriptors: (*Power supplies, Fuel cells), (*Fuel cells, Biochemistry), Carboxylic acids, Formates, Bacteria, Electrochemistry, Electrodes, Polarization, Anodes (Electrolytic cell), Fluid flow, Electric currents, Distillation, Lactic acid.

A 45% increase in current density was obtained by circulating the formate fermentation mixture through a perforated electrode, instead of using a static system. A current density of 19 mA/sq cm at a polarization of 0.15 V was obtained from a 0.03 M formate fermentation mixture at pH 1. The open circuit potential at this pH is -0.25 V vs. SCE. A new formic acid analysis, suitable for use with small amounts of fermentation mixtures, has been developed. It consists of two steps - vacuum distillation to separate the formic acid from interfering compounds, and oxidation to CO2 with Pb (OAc)4 to determine formic acid in the distillate. (Author)

NAA-SR-11879 **Field 10A, 11F, 18L, 18N**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
SNAP-10A THERMOELECTRIC PUMP.
Final rept.,
by K. A. Davis. 15 Jul 66, 82p
Contract AT (11-1)-GEN-8

Descriptors: (*Energy conversion, Thermoelectricity), (*Thermoelectricity, Pumps).

For abstract, see NSA 20 21.

N66-30542 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Harshaw Chemical Co., Cleveland, Ohio. Crystal-solid State Div.
RESEARCH AND DEVELOPMENT IN CD S PHOTOVOLTAIC CELLS THIRD QUARTERLY REPORT, 29 DEC. 1965 - 29 MAR. 1966.
by T. A. Griffin, E. R. Hill, and J. C. Schaefer. 1966, 34p NASA-CR-54996
Contract NAS3-7631

Descriptors: *Barrier layer, *Cadmium sulfide, *Copper sulfide, *Formation, *Photovoltaic cell, Barrier, Cadmium, Cell, Copper, Diffusion, Electroplating, Encapsulation, Grid, Layer, Photovoltaic, Rate, Space, Sulfide, Transmission, Transport, Vapor.

For abstract, see STAR 04 17.

N66-31226 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Monsanto Research Corp., Everett, Mass. Boston Lab.
STUDY OF FUEL CELLS USING STORAGE ROCKET PROPELLANTS QUARTERLY REPORT NO. 5, 19 FEB. - 18 MAY 1966.
by L. F. Athearn, R. E. Chute, R. F. Drake, J. C. Orth, and J. O. Smith. 1966, 46p NASA-CR-54988, MRB5009Q5
Contract NAS3-6476

Descriptors: *Hydrox fuel cell, *Purification, *Storable propellant, Aerozine, Cell, Diffuser, Efficiency, Electrode, Fuel Hydrogen, Hydrox, Membrane, Oxygen, Palladium, Polarization, Propellant, Rocket, Storage.

For abstract, see STAR 04 17.

N66-31902 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Electro-optical Systems, Inc., Pasadena, Calif.
HYDROGEN-OXYGEN ELECTROLYTIC REGENERATIVE FUEL CELLS QUARTERLY REPORT, 1 APR. - 30 JUN. 1966.
by M. G. Klein. 15 Jul 66, 51p NASA-CR-76477, EOS-4110-QL-8
Contract NAS3-2781

Descriptors: *Auxiliary power source, *Electrolysis, *Hydrogen, *Oxygen, *Regenerative fuel cell, Asbestos, Auxiliary, Cell, Corrosion, Cycle, Electrode, Fuel, Gas, Life, Matrix, Performance, Potassium, Power, Regeneration, Single, Source, Storage, Structure, Tank, Titanate.

For abstract, see STAR 04 17.

N66-32256 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Electro-optical Systems, Inc., Pasadena, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
HIGH-TEMPERATURE, ZERO-DROP THYRATRON TUBE PROGRAM QUARTERLY PROGRESS REPORT, 1 APR. - 31 MAY 1966.
by W. J. Kearns. 15 Jun 66, 34p NASA-CR-76682, EOS-7016-Q-2
Contracts NAS7-100, JPL-951352
Prepared For Jpl

Descriptors: *High temperature research, *Thermionic converter, *Thyratron, Circuit, Conditioning, Conversion, Converter, Deionization, Design, Device, Energy, Generator, High temperature, Insulation, Power, Research, System, Thermionic, Time, Transformer.

For abstract, see STAR 04 17.

N66-32284 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF SOLAR THERMOELECTRIC FLAT-PLATE GENERATORS OPERATING IN THE RANGE OF 1.0 TO 0.1 ASTRONOMICAL UNIT.
by W. J. Bifano. Aug 66, 16p NASA-TM-X-1263
Contract 120-27-06-02-22

Descriptors: *Flat plate, *Germanium, *Lead telluride, *Silicon, *Solar generator, *Thermoelectric material, Earth, Fabrication, Flat, Flux, Generator, Lead, Material, Mercury, Panel, Planet, Plate, Range, Semiconductor, Solar, Telluride, Thermoelectric, Tilting, Venus.

For abstract, see STAR 04 17.

N66-32676 **Field 10A**
CFSTI Prices HC$2.50 MF$0.75
Texas Instruments, Inc., Dallas. Semiconductor-components Div.
ADVANCEMENT OF THE STATE-OF-THE-ART IN THE PRODUCTION OF DRIFT FIELD SOLAR CELLS FINAL PROJECT REPORT, 23 JUN. 1965 - 23 JAN. 1966.
1966, 88p NASA-CR-76832, TI-03-66-21
Contract NAS5-9609

Descriptors: *Electric field, *Radiation resistance, *Solar cell, Capability, Cell, Concentration, Drift, Electric, Environment, Epitaxy, Fabrication, Field, Impurity, Profile, Radiation, Resistance, Solar, Space.

For abstract, see STAR 04 17.

N66-37040 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
Clevite Corp., Cleveland, Ohio. Electronic Research Div.
STUDY OF THIN FILM LARGE AREA PHOTOVOLTAIC SOLAR ENERGY CONVERTER THIRD QUARTERLY REPORT, 25 APR. - 24 JUL. 1966.
by W. K. Bower, J. R. Hietanen, and F. A. Shirland. 24 Aug 66, 24p NASA-CR-72077
Contact NAS3-8502

Descriptors: *Cadmium sulfide, *Photovoltaic conversion, *Solar converter, *Thin film, Area, Attachment, Cadmium, Cell, Coating, Condition, Conduction, Difficulty, Efficiency, Fabrication, Film, Humidity, Large, Plastic, Stability, Substrate, Sulfide, Temperature, Thin.

For abstract, see STAR 04 22.

N66-37213 **Field 10A**
CFSTI Prices HC$3.00 MF$0.75
Radio Corp. Of America, Mountaintop, Pa. Industrial Tube And Semiconductor Div.
MATERIALS DEVELOPMENT FOR SOLAR CELL APPLICATIONS FINAL REPORT, 1 JUN. 1965 - 31 MAY 1966.
by A. R. Topfer. 25 Jun 66, 78p NASA-CR-78132

Descriptors: *Aluminum antimonide, *Material testing, *Silicon, *Solar cell, Aluminum, Annealing, Antimonide, Cell, Characteristics, Concentration, Diffusion, Diode, Effect, Environment, Fabrication, Impurity, Lithium, Material, Performance, Radiation, Solar, Surface, Testing.

For abstract, see STAR 04 22.

N66-37279 **Field 10A**
CFSTI Prices HC$3.75 MF$1.50
Radio Corp. Of America, Princeton, N. J. Astro-electronics Div.
NIMBUS- B SOLAR-CONVERSION POWER SUPPLY SUBSYSTEM QUARTERLY TECHNICAL REPORT NO. 3, MAR. - MAY 1966.
8 Jul 66, 234p NASA-CR-78279, AED-R-2994
Contract NAS5-9668

Descriptors: *Nimbus satellite, *Solar converter, *Spacecraft power supply, Battery, Conversion, Nimbus, Operation, Performance, Power, Satellite, Solar, Spacecraft, Subsystem, Supply.

For abstract, see STAR 04 22.

N66-3729 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF SOLAR THERMIONIC CONVERSION SYSTEMS OPERATING IN THE RANGE OF 1.0 TO 0.1 ASTRONOMICAL UNIT.
by W. J. Bifano. Oct 66, 11p NASA-TM-X-1262
Contract 120-27-06-06-22

Descriptors: *Solar converter, *Thermionic conversion system, Cesium, Concentrator, Conversion, Converter, Diode, Electric, Flux, Generator, Load, Power, Resistance, Solar, System, Temperature, Thermionic, Weight.

For abstract, see STAR 04 22.

N66-37303 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF MOISTURE ON CADMIUM SULFIDE SOLAR CELLS.
by F. L. Acampora, R. E. Hart Jr, and A. E. Spakowski. Oct 66, 16p NASA-TN-D-3663
Contract 123-33-01-02-22

Descriptors: *Cadmium sulfide, *Moisture, *Solar cell, *Thin film, Adhesive, Cadmium, Cell, Diode, Effect, Film, Humidity, Performance, Response, Solar, Spectral, Stability, Sulfide, Thin.

For abstract, see STAR 04 22.

N66-37419 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
APOLLO FUEL-CELL CONDENSER HEAT-TRANSFER TESTS.
by M. B. Weinstein. Oct 66, 31p NASA-TM-X-1290
Contract 123-34-02-01-22

Descriptors: *Apollo spacecraft, *Condenser, *Fuel cell, *Heat transfer, Balance, Cell, Coefficient, Coolant, Fuel, Heat, Production, Temperature, Waste, Water.

For abstract, see STAR 04 22.

10B. POWER SOURCES

AD-640 700 **Field 10B**
CFSTI Prices: HC$3.00 MF$0.75
Pratt and Whitney Aircraft, East Hartford, Conn.
500 WATT FUEL CELL POWERPLANT.
Final rept. no. 2, 1 Oct 64-15 Jun 66,
by T. G. Schiller. Oct 66, 74p PWA-2905
Contract DA-28-043-AMC-00320 (E)
Proj. DA-1C6-22001-A-053

Task 1C6-22001-A-053-04
ECOM-00 0-F
See also AD-628 159.

Descriptors: (*Fuel cells, Power supplies), (*Power supplies, Portable), Hydrogen, Air, Gas generating systems, Hydrocarbons, Fuels, Feasibility studies, Design.

The feasibility of a man-portable, 500 watt, indirect liquid hydrocarbon and air, fuel cell powerplant was established. Two independent units were developed - a Hydrogen Generator Assembly and a Fuel Cell Assembly. The Hydrogen Generator Assembly converts the hydrocarbon fuel to hydrogen by steam reforming, and the Fuel Cell Assembly electrochemically oxidizes the hydrogen with air to produce electrical energy. The two units are integrated for operation and designed to produce 500 watts of net electrical power. (Author)

AD-640 867 **Field 10B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Lab., Fort Monmouth, N. J.
INEXPENSIVE CATALYSTS FOR HYDRAZINE FUEL CELL ANODES.
Technical rept.,
by John Perry Jr. Aug 66, 19p ECOM-2743
Task 1C6-22001-A-053-04

Descriptors: (*Anodes, Fuel cells), (*Hydrazine, *Catalysts), Iron, Palladium, Nickel alloys, Boron alloys, Platinum, Nickel, Electric currents, Density, Life expectancy, Gold, Copper, Voltage.

Identifiers: Nickel boride.

The use of elemental iron on porous nickel substrates as a hydrazine anode was found to give anodic current densities equal to that of palladium catalyst. Anodic curent densities of 100 mA/sq cm at 0.060 V polarization have been obtained at temperatures of 60C, with fuel concentrations of 3M N2H4 in 5M KOH. The Fe hydrazine anode has operated well over 200 hours at 100 mA/sq cm (showing stable performance). The initial anode potential vs SCE under load was -1.20 V. This voltage was maintained with little variation through the life testing. (Author)

AD-640 968 **Field 10B, 9A**
CFSTI Prices: HC$3.00 MF$0.75
IIT Research Inst., Chicago, Ill.
STATIC ELECTRIC POWER INVERSION USING SEMICONDUCTOR DEVICES.
Final rept.,
by Harlan G. Hamre, and Oleh M. Kuritza. Sep 66, 67p
Contract NBy-62189
Projs. E6068, Y-F015-12-08-001
NCEL-CR-67.009

Descriptors: (*Inverters, *Semiconductor devices), Power equipment, Inverter circuits, Performance (Engineering), Silicon controlled rectifiers.

Results of a study of static electric power inversion techniques using semiconductor devices are given, including recommendations that bridge-type inverters, employing impulse commutation, sinusoidal wave form synthesis using stepped-wave techniques, and output voltage control within the inverter by use of pulse-width methods, are most suitable for use in the design of a family of inverters in the power range from 10 KW to 600 KW. Additional requirements of transient stability, frequency control, reliability, electromagnetic compatibility, and system costs are considered. Comparative analysis of various solid state devices and inverter techniques, and their advantages and disadvantages are discussed. Present trends in the development of static power inverter equipment are considered and future trends are anticipated, where possible. Recommendations are given to indicate areas where additional investigation is needed. (Author)

AD-641 019 **Field 10B**
CFSTI Prices: HC$1.00 MF$0.50
Avco Everett Research Lab., Everett, Mass.
PRODUCTION OF HIGH ENERGY ELECTRICAL IMPULSES WITH AN MHD GENERATOR.
Quarterly technical summary rept. 1 May-31 Jul 66,
Aug 66, 13p
Contract AF 33 (615)-2846

Descriptors: (*Magnetohydrodynamic generators, Tests), Electromagnetic pulses, Circuits, Fuels, Heaters.

The period covered by the report was devoted to systems and components testing, burner testing, generator excitation testing, as well as a complete configuration single circuit power test. The resulting data from the excitation and power output tests indicates close agreement with the design parameters. The single circuit power test was terminated at a magnet current of approximately 15,000 amperes and resulted in a maximum net power output of 11,000 kilowatts. During this period some problems were encountered, mainly with the older equipment, which required revisions to such items as pilot and igniter fuel systems, pilot cooling and the main fuel-nitrogen purge systems. Section II describes modification to the igniter and pilot burners and to the channel inlet section, as well as the results of the complete configuration tests. (Author)

N66-37138 **Field 10B**
CFSTI Prices HC$8.85 MF$4.00
Westinghouse Electric Corp., Lim, Ohio. Aerospace Electrical Div.
RESEARCH AND DEVELOPMENT PROGRAM ON MAGNETIC ELECTRICAL CONDUCTOR, ELECTRICAL INSULATION, AND BORE SEAL MATERIALS - ELECTRICAL CONDUCTOR AND ELECTRICAL INSULATION MATERIALS TOPICAL REPORT.
by P. E. Kueser, D. H. Lane, and W. S. Neff. Oct 64, 836p NASA-CR-54092, WAED-64.53E
Contract NAS3-4162
Prepared In Part By Eitel-mcculloh Corp.

Descriptors: *Electric conductor, *Insulation, *Spacecraft power supply, Bore, Conductor, Electric, Magnetic, Material, Mechanical, Physical, Power, Property, Seal, Spacecraft, Supply, System, Thermal.

For abstract, see STAR 04 22.

AD-454 420 **See Field 7D**

AD-475 795 **See Field 9C**

10C. ENERGY STORAGE

AD-466 291 **Field 10C**
CFSTI Prices: HC$6.60 MF$0.75
Edison (Thomas A.), Industries, Bloomfield, N. J. Primary Battery Div.
AUXILIARY ELECTRODE FOR CHARGE CONTROL OF SEALED NICKEL-CADMIUM BATTERIES.
Quarterly progress rept. no. 3, 15 Dec 64-14 Mar 65.
by Philip F. Grieger. 14 Mar 65, 65p
Contract DA-28-043-AMC-00152 (E)
Proj. 106-22001-A-053-02

Descriptors: (*Batteries + components, Electrodes), (*Electrodes, Batteries + components), Nickel, Cadmium, Oxygen, Polarization, Voltage, Electrolytes, Potassium compounds, Hydroxides, Metallic textiles, Platinum, Hermetic seals, Effectiveness, Interference, Contamination, Carbonates.

For platinized cloth auxiliary electrodes the quantity of electrolyte is critical; with too little electrolyte the 02 reduction polarization curve is concave upward, with too much it shows a good plateau and voltageOat low currents, but falls off prematurely and sharply. For VCB or WCB Black the optimum amount is about 0.13 plus or minus .01 gram of 30% KOH per square inch. Contamination by CO2 adversely affects performance, but with the optimum quantity of KOH, conversion of 30 equivalent % to carbonate can be tolerated. As O2 reduction electrodes unplatinized cloths are only 1/5 to 1/10 as good as platinized ones. Platinized cloths moistened with 30% KOH catalyze the H2 plus O2 reaction at a moderate rate. Techniques have been worked out for modifying commercial hermetically sealed cells to allow incorporation of cloth auxiliary electrodes. (Author)

AD-640 856 **Field 10C**
CFSTI Prices: HC$1.00 MF$0.50
Ray-O-Vac Co., Madison, Wis.
DEVELOPMENT OF MAGNESIUM FLAT CELL BATTERY.
Quarterly rept. no. 1, 1 May-31 Jul 66,
by Philip F. Albert. Oct 66, 21p
Contract DA-28-043-AMC-02136 (E)
Proj. DA-1C6-22001-A-053
Task 1C6-22001-A-05302
ECOM-02136-1

Descriptors: (*Batteries + components, Magnesium), Dry cells, Primary cells, Anodes, Magnesium compounds, Bromides, Perchlorates, Performance (Engineering), Electrolytes, Sandwich construction.

A literature search of magnesium cell technology was conducted to determine which formulations, ratios, and materials give maximum battery performance and minimum delayed action in the magnesium-manganese dioxide electrochemical system. Bench and oven testing was also carried out to determine the most suitable raw materials for the first series of batteries. Two lots of batteries, one lot using magnesium perchlorate electrolyte and one using magnesium bromide electrolyte, were assembled with each battery containing five flat cells using magnesium anodes. Initial performance figures on BA-399, continuous and intermittent drain discharge tests are given. (Author)

N66-30077 **Field 10C**
CFSTI Prices HC$1.00 MF$0.50
Gulton Industries, Inc., Metuchen, N. J.
INVESTIGATION OF STERILIZATION OF SECONDARY BATTERIES QUARTERLY PROGRESS REPORT NO. 1, OCT. 26, 1965 - JAN. 26, 1966.
by J. Liska. 1966, 23p NASA-CR-66105
Contract NAS1-5708

Descriptors: *Asbestos, *Nickel-cadmium battery, *Polypropylene, *Separator, *Sterilization, Battery, Cadmium, Cell, Heating, Hydroxide, Material, Nickel, Nylon, Potassium, Testing.

For abstract, see STAR 04 17.

N66-31357 **Field 10C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF PERFORMANCE OF DOUBLE-REFLECTOR SYSTEM FOR COLLECTING SOLAR ENERGY.
by G. Kaykaty. Jul 66, 29p NASA-TN-D-3534

Descriptors: *Brayton cycle, *Parabolic reflector, *Solar energy, Analysis, Aperture, Collection, Double, Efficiency, Ellipsoid, Energy, Hyperbola, Parabolic, Performance, Power, Reflector, Solar, Surface, System.

For abstract, see STAR 04 17.

N66-31895 **Field 10C**
CFSTI Prices HC$1.00 MF$0.50
Naval Ammunition Depot, Crane, Ind. Quality Evaluation Lab.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS. ACCEPTANCE TEST

OF SONOTONE CORPORATION 3.5 AMPERE-HOUR SEALED NICKEL-CADMIUM CELLS.
by H. M. Schultz. 6 Jun 66, 16p NASA-CR-76520, QE/C-66-340
NASA ORDER W-11252B

Descriptors: *Leakage, *Nickel-cadmium battery, *Spacecraft power supply, *Storage battery, Acceptance, Atmospheric, Battery, Cadmium, Capacity, Cell, Ceramic, Humidity, Immersion, Internal, Nickel, Overcharge, Phenol, Power, Pressure, Relative, Resistance, Seal, Secondary, Spacecraft, Storage, Supply, Test.

For abstract, see STAR 04 17.

N66-31896 **Field 10C**
CFSTI Prices HC$1.00 MF$0.50
Naval Ammunition Depot, Crane, Ind. Quality Evaluation Lab.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS. ACCEPTANCE TEST OF C AND D BATTERIES, 5.0 AMPERE-HOUR SEALED-CALCIUM CELLS.
6 Jun 66, 15p NASA-CR-76517, QE/C-66-399
NASA ORDER W-11252B

Descriptors: *Calcium, *Lead, *Leakage, *Spacecraft power supply, *Storage battery, Battery, Capacity, Cell, Electrochemical, Internal, Overcharge, Power, Resistance, Secondary, Spacecraft, Storage, Supply, Test, Visual.

For abstract, see STAR 04 17.

N66-31917 **Field 10C**
CFSTI Prices HC$1.00 MF$0.50
Central Lab. Tno, Delft (Netherlands).
ON THE ACCUMULATION OF GAS DURING STORAGE OF NBA-030 BATTERIES AT 45 DEG C.
Gasontwikkeling In Nba-030 Batterijen Bij 45 Deg C
by R. H. Sieh. 28 Apr 66, 14p CL-66/50, TDCK-45553
In Dutch

Descriptors: *Electrochemical cell, *Gas, *Storage battery, Accumulation, Apparatus, Battery, Cell, Effect, Electrochemical, Magnesium, Measurement, Netherlands, Oxide, Storage, Test, Zinc.

For abstract, see STAR 04 17.

N66-32667 **Field 10C**
CFSTI Prices HC$2.00 MF$0.50
Unified Science Associates, Inc., Pasadena, Calif.
GASEOUS ELECTROLYTES FOR BATTERIES AND FUEL CELLS SEVENTH QUARTERLY REPORT, 21 FEB. - 20 MAY 1966.
by S. Naiditch. 1966, 30p NASA-CR-76976
Contract NAS7-326

Descriptors: *Battery, *Electrolyte, *Fuel cell, Amalgam, Cadmium, Cell, Density, Electrode, Fuel, Gas, Salt, Solubility, Zinc.

For abstract, see STAR 04 17.

N66-37038 **Field 10C**
CFSTI Prices HC$3.00 MF$1.00
Globe-union, Inc., Milwaukee, Wis.
A PROGRAM TO DEVELOP A HIGH-ENERGY DENSITY PRIMARY BATTERY WITH A MINIMUM OF 200 WATT HOURS PER POUND OF TOTAL BATTERY WEIGHT EIGHTH QUARTERLY REPORT, 1 APR. - 30 JUN. 1966.
by W. E. Elliott, J. R. Huff, J. L. Jamrozy, G. D. Mc donald, and G. L. Simmons. 15 Jul 66, 116p NASA-CR-72040
Contract NAS3-6015

Descriptors: *Electrochemistry, *Lithium, *Magnesium, Acetonitrile, Aluminum, Anode, Battery, Cathode, Chloride, Density, Electrolyte, Energy, Oxidation, Reaction, Voltage.

For abstract, see STAR 04 22.

N66-37408 **Field 10C**
CFSTI Prices HC$2.50 MF$0.75
Monsanto Research Corp., Everett, Mass. Boston Lab.
DEVELOPMENT OF THE DRY TAPE BATTERY CONCEPT QUARTERLY REPORT NO. 4, 9 MAR. - 9 JUN. 1966.
by J. S. Driscoll, and D. L. Williams. 2 Aug 66, 69p NASA-CR-54771, MRB5010Q4
Contract NAS3-7624

Descriptors: *Dry cell battery, *Electrolyte, *Energy density, Aqueous, Battery, Cell, Density, Dry, Energy, Salt, Tape, Water, Wetting.

For abstract, see STAR 04 22.

N66-37541 **Field 10C**
CFSTI Prices HC$2.00 MF$0.50
Marine Engineering Lab., Annapolis, Md.
NICKEL-CADMIUM BATTERY RECONDITIONER.
by F. E. Ford. Aug 66, 40p NASA-CR-78363, MEL-183/66
NASA ORDER S-12730-G

Descriptors: *Automatic control, *Charge, *Nickel-cadmium battery, Cell, Current, Detector, Device, Electrochemistry, Power, Voltage.

For absract, see STAR 04 22.

11A. ADHESIVES AND SEALS

N66-30539 **Field 11A**
CFSTI Prices HC$3.00 MF$0.75
Marquardt Corp., Van Nuys, Calif.
APOLLO SERVICE MODULE REACTION CONTROL SYSTEM ENGINE CHAMBER SEAL STUDY MATERIALS REPORT.
by J. Puntar. 1966, 83p NASA-CR-65420, MR-3008-F
Contract NAS9-4775
19660 83 P Refs

Descriptors: *Combustion chamber, *Injector, *Material testing, *Service module, Alloy, Apollo spacecraft, Base, Chamber, Cobalt, Combustion, Configuration, Head, Material, Measurement, Metal, Module, Nonmetallic, Oxide, Rene 41, Resistance, Seal, Service, Testing, Thermal, Titanium, Zirconium.

For abstract, see STAR 04 17.

N66-31240 **Field 11A**
CFSTI Prices HC$1.00 MF$0.50
Fighting Vehicles Research And Development Establishment, Chertsey (England).
THE LOCKING OF THREADED FASTENERS BY LIQUID SEALANTS.
by N. D. Brown. 28 Sep 65, 22p M-58-W

Descriptors: *Bolt, *Bonding, *Fastener, *Military vehicle, Accelerator, Adhesive, Clean, Joint, Liquid, Locking, Military, Motor, Sealant, Setting, Thread, Torque, Vehicle.

For abstract, see STAR 04 17.

N66-31618 **Field 11A**
CFSTI Prices HC$3.00 MF$0.75
Goodyear Aerospace Corp., Akron, Ohio.
INVESTIGATION OF FABRICATION AND PROCESSING PARAMETERS ASSOCIATED WITH USE OF POLYURETHANE FOAMS IN SEALED CRYOGENIC INSULATION FINAL REPORT.
by C. B. Shriver. 25 Jun 65, 85p NASA-CR-72025, GER-12249
Contract NAS3-5646

Descriptors: *Foamed material, *Polyurethane foam, *Sealing, *Thermal insulation, Adhesive, Barrier, Characteristics, Compression, Conditioning, Cryogenic, Fabrication, Film, Foam, Insulation, Mass, Material, Outgassing, Permeability, Polyurethane, Spectrometer, Thermal, Vacuum, Vapor.

For abstract, see STAR 04 17.

AD-641 120 **See Field 7C**

AD-641 121 **See Field 6P**

11B. CERAMICS, REFRACTORIES, AND GLASSES

AD-640 847 **Field 11B**
CFSTI Prices: HC$1.00 MF$0.50
Vermont Univ., Burlington.
THE EFFECTS OF HIGH UNIAXIAL COMPRESSIVE STRESS ON GLASS,
by J. O. Outwater, and D. J. Gerry. 10 Aug 66, 19p
Contract Nonr-3219 (01)

Descriptors: (*Glass, Stresses), Compressive properties, Failure (Mechanics), Light, Heat-resistant glass, Rods.

Necked Pyrex rods were used to obtain the values of uniaxial compression stress on glass. Stresses up to 547,000 psi were measured and some unusual phenomena were noted: instead of splintering, the glass failed by giving a coherent mass and at the same time set up tensile waves in the specimen. Light was emitted on failure. No creep was observed either under direct uniaxial stress of between 400,000 and 500,000 psi of 1 sec. duration or in the areas of stress concentration around a cylindrical hole drilled through the point of highest stress. The results of this work tend to substantiate a time dependent plastic flow theory. (Author)

AD-640 848 **Field 11B**
CFSTI Prices: HC$1.00 MF$0.50
Vermont Univ., Burlington.
ON THE FRACTURE ENERGY OF GLASS,
by J. O. Outwater, and D. J. Gerry. 29 Aug 66, 17p
Contract Nonr-3219 (01)

Descriptors: (*Glass, *Fracture (Mechanics)), Loading (Mechanics), Energy, Velocity, Surface-active substances.

The fracture energy of glass has been measured at crack velocities ranging from 10 to the minus 7th power to 0.01 cms. per sec. both in normal air and in various environments. It shows no minimum value but decreases logarithmically as the velocity gets less. The effects of repeated loading on the crack propagation rate are strongly dependent on the frequency of the loading. These results differ from the effects in metals where the crack propagation rate is substantially independent of the loading frequency and are in accord with predictions based on the theory of glass acting as a ductile material. (Author)

N66-30541 **Field 11B**
CFSTI Prices HC$4.00 MF$0.75
Aerojet-general Corp., Sacramento, Calif. Liquid Rocket Operations.
1.5 MILLION POUND LOAD CELL CALIBRATION AND H-AREA THRUST MEASURING SYSTEM TECHNOLOGY REPORT.
by J. R. Close, W. A. Hoy, and K. A. Vernon. 27 Jun 66, 114p NASA-CR-54793, AGC-8800-66
Contract NAS3-2555

Descriptors: *Calibration, *Load testing machine, *Thrust measurement, Cell, Chamber.

Data, Design, Force, Load, Machine, Measurement, Multiplier, System, Testing, Thrust.

For abstract, see STAR 04 17.

N66-31363 **Field 11B**
CFSTI Prices HC$3.00 MF$0.75
Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.
DEVELOPMENT OF ALKALI METAL PEROXIDE AND SUPEROXIDE BLOWN CERAMIC FOAMS FINAL REPORT, 22 JUN. 1965 - 15 MAR. 1966.
by E. W. Blocker, and R. D. Paul. 5 Apr 66, 71p NASA-CR-76406
Contract NAS8-20089

Descriptors: *Alkali metal, *Ceramics, *Foamed material, *Thermal insulation, Alkali, Compound, Foam, Insulation, Material, Mechanical, Metal, Optical, Peroxide, Phosphate, Physical, Property, Superoxide, Thermal, Zirconium.

For abstract, see STAR 04 17.

N66-37417 **Field 11B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
ABLATIVE AND INSULATING PROPERTIES OF OUTGASSED BORON NITRIDE AND BORON NITRIDE COMPOSITE.
by A. F. Okuno. Oct 66, 21p NASA-TN-D-3660
Contract 129-01-09-06

Descriptors: *Ablation, *Boron nitride, *Composite material, *Insulation, *Phenol resin, Boron, Composite, Heat, Material, Nitride, Nitrogen, Outgassing, Phenol, Property, Pyrolysis, Resi, Temperature, Test.

For abstract, see STAR 04 22.

AD-640 689 **See Field 20K**

AD-640 695 **See Field 13H**

AD-640 723 **See Field 11G**

AD-640 844 **See Field 20C**

AD-640 992 **See Field 13M**

PB-173 053 **See Field 6E**

PB-173 186 **See Field 18J**

PB-173 271 **See Field 13M**

11C. COATINGS, COLORANTS, AND FINISHES

AD-640 733 **Field 11C**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
EFFECT OF PHOTODEGRADATION ON ATTENUATED TOTAL REFLECTANCE SPECTRA OF ORGANIC COATINGS.
Technical rept.,
by Peter J. Hearst. Sep 66, 32p TR-R-479
Proj. Y-F020-03-03-004

Descriptors: (*Organic coatings, Degradation), (*Plastic coatings, Degradation), Films, Reflection, Spectroscopy, Photochemistry, Polyester plastics, Vinyl plastics, Epoxy plastics, Amino plastics, Polyamide plastics, Pigments, Environmental tests, Simulation.

Clear and pigmented films of various coating vehicles were irradiated in air with a mercury arc and with a xenon arc. Attenuated total reflectance (ATR) spectra were obtained before and after the irradiations in an attempt to find an accelerated test method for determining coating performance. The coatings included alkyd, vinyl-alkyd, partially hydrolyzed vinyl copolymer, vinyl copolymer, epoxy-amine, and epoxy-polyamide films. Although the mercury-arc irradiations produced considerable effects on the ATR spectra of clear vehicle films, the xenon-arc irradiations produced comparatively negligible effects. Whereas the observable effects of mercury-arc irradiations on pigmented films were less than on clear films, the reverse was true with the xenon-arc irradiations, which produced appreciable effects only on some of the pigmented films. These differences in results may be related primarily to the spectral distribution of the irradiating light and to the resultant dfferences in penetration and reflection within the film. ATR spectroscopy may prove to be useful in an accelerated method for determining deterioration in pigmented organic coatings, but it does not appear useful for clear films. (Author)

AD-640 901 **Field 11C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
REACTIVATION OF CHROMATED CONVERSION COATINGS FOR MAXIMUM PAINT ADHESION,
by Peter J. Sabatini. 7 Sep 66, 16p NAEC-AML-2503
Task A32-523-001/200-1/F020-01-01

Descriptors: (*Coatings, Degradation), (*Paints, Adhesion), Alumimum alloys, Aging (Materials), Cleaning, Surfaces, Contamination, Cleaning compounds, Plastic paints, Epoxy plastics.

Aircraft manufacturers have had considerable difficulty with adhesion of the epoxy paint system to aged chromated aluminum surfaces. This report presents results of an investigation of various methods to reactivate such surfaces and recommends several procedures that were effective in improving paint adhesion. (Author)

AD-641 177 **Field 11C, 11F, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
PROTECTIVE COATINGS FOR MAGNESIUM,
by John R. Aldridge. 14 Sep 66, 43p NOLTR-66-110
Proj. RMMO-32-055/212-1/W27-14M

Descriptors: (*Magnesium alloys, *Corrosion inhibition), (*Coatings, Corrosion inhibition), Salt spray tests, Plastic coatings, Paint primers, Signals, Smokes, Signal lights, Military requirements.

Following a survey of military specifications, several coatings were tested for the Signal, Smoke and Illumination, Submarine, Ex 85, Mod O, which is made of magnesium. The best materials were subjected to salt spray tests. Results show alkaline resistant coatings of 2.0 to 4.0 mils, such as epoxies, polyurethanes and vinyls, are satisfactory over suitable pretreatments. (Author)

PB-173 375 **See Field 13H**

11D. COMPOSITE MATERIALS

N66-31355 **Field 11D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
FIBER-METAL COMPOSITE MATERIALS.
by R. A. Signorlli, and J. W. Weeton. Aug 66, 43p NASA-TN-D-3530
Presented At The 12th Sagamore Army Mater. Res. Conf., Roquette Lake, N. Y., 24-27 Aug. 1965, Sponsored By Army Mater. Res. Agency

Descriptors: *Composite material, *Fiber, *Reinforced material, Ceramic, Composite, Creep, High temperature, Load, Material, Matrix, Metal, Polycrystal, Reinforced, Resistance, Rupture, Strain, Strength, Stress, Tensile, Transfer.

For abstract, see STAR 04 17.

N66-31623 **Field 11D**
CFSTI Prices HC$6.00 MF$1.25
General Electric Co., Philadelphia, Pa.
STUDIES OF MECHANICS OF FILAMENTARY COMPOSITES ANNUAL REPORT, SEP. 27, 1964 - SEP. 26, 1965.
by N. F. Dow, Z. Hashin, and B. W. Rosen. Jun 66, 228p NASA-CR-492
Contract NASW-1144

Descriptors: *Binder, *Composite material, *Filament winding, *Reinforced material, Composite, Configuration, Density, Dimensional, Effect, Efficiency, Fiber, Filament, Hollow, Material, Mechanics, Photoelasticity, Reinforced, Reinforcement, Stiffness, Structural, Three, Viscoelasticity, Winding.

For abstract, see STAR 04 17.

N66-31667 **Field 11D**
CFSTI Prices HC$2.00 MF$0.50
General Technologies Corp., Alexandria, Va.
A STUDY OF LOW DENSITY, HIGH STRENGTH HIGH MODULUS FILAMENTS AND COMPOSITES.
by J. A. Alexander, R. G. Shaver, and J. C. Withers. Jul 66, 27p NASA-CR-523
Contract NASW-1020

Descriptors: *Composite material, *Filament, *Multilayer structure, *Reinforced material, *Whisker, Aluminum, Boron, Carbide, Composite, Fabrication, High strength, Laminar, Material, Multilayer, Niobium, Reinforcement, Sapphire, Silicon, Testing.

For abstract, see STAR 04 17.

N66-37223 **Field 11D**
CFSTI Prices HC$1.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile And Space Div.
STUDY OF THE GROWTH PARAMETERS INVOLVED IN SYNTHESIZING BORON CARBIDE FILAMENTS SECOND QUARTERLY REPORT.
by V. A. Cordua, E. Feingold, A. Gatti, and J. J. Gebhardt. 20 Aug 66, 20p NASA-CR-78260
Contract NASW-1383
Its Rept.-214-1b6

Descriptors: *Boron carbide, *Synthesis, *Whisker, Annealing, Boron, Carbide, Composite, Crystal, Dynamic, Filament, Growth, Mechanical, Method, Parameter, Property, Vapor.

For abstract, see STAR 04 22.

AD-640 660 **See Field 19F**

AD-640 689 **See Field 20K**

KLX-1876 **See Field 18B**

11E. FIBERS AND TEXTILES

PB-173 310 **Field 11E**
CFSTI Prices: HC$2.00 MF$0.50
North Carolina State Univ., Raleigh. Dept. of Textile Chemistry.
A TRAINING AND RESEARCH PROGRAM IN THE FIELD OF INSTRUMENTAL COLOR CONTROL FOR TEXTILES.
Final rept., 13 Aug 65-30 Jun 66.
30 Jun 66, 44p
Contract CST-107

Descriptors: (*Textiles, *Dyes), Colors, Control, Training, Additives, Absorption, Organic solvents.

The phenomenon of non-additivity of spectral absorbance values was explored for a selected group of direct azo dyestuffs. Whereas previous investigations have been restricted to studies of a single dye which usually does not obey Beer's law or for dye mixtures which are nonadditive in aqueous solutions, the present work examined non-additivity in water solutions and in solutions containing water and a few polar organic solvents. Mixtures composed of two dyes were made and the absorbance of the mixture was compared to that which would be expected based on the absorbance values of the individual dyestuff in the samemedium. Differences between the predicted and actual absorbances were found to be most marked in water solutions with less deviation as more and more organic solvent was introduced. The solvents used were ethylene glycol, methyl alcohol, ethyl alcohol, dimethyl sulfoxide and formamide. Although some of the solvents were effective in reducing or eliminating non-additivity, it was not possible to establish any clear pattern of behavior for each of the dyestuffs. For this reason it is concluded that this approach to the problem is not practical, and should not be pursued further. (Author)

11F. METALLURGY AND METALLOGRAPHY

AD-441 239 **Field 11F**
CFSTI Price: HC$2.60
Aerospace Corp., El Segundo, Calif.
THE STABILITY OF SELECTED OXIDES, NITRIDES AND BORIDES IN MOLYBDENUM TO 4000F,
by J. E. White. 20 May 64, 30p Technical documentary rept. TDR-269 (4240-10)-12
Contract AF 04 (695)-269
SSD-TDR-64-88

Descriptors: (*Molybdenum, Composite materials), (*Composite materials, Refractory materials), Stability, Heat, Nitrides, Boron compounds, Borides, Lanthanum compounds, Dioxides, Zirconium compounds, Thorium compounds, Hardness, Hot working, Tantalum compounds, Oxides, Yttrium compounds, Magnesium compounds, Particle size, Powder metallurgy, Electric furnaces, Vacuum, Metallography, Microstructure, Dispersion hardening.

Presented is an evaluation of the compatibility between molybdenum and several refractory compounds as dispersed phases in the 3000 to 4000F temperature range. Compounds included in the study are BN, ZrN, HfN, LaB6, ZrO2 and ThO2. Hot-pressed alloys, consisting of nominally 2.5 vol % of the refractory phase in a molybdenum matrix, were vacuum annealed to evaluate temperature stability. Evaluation was based on changes in grain size, dispersed phase morphology, hardness and gross macroscopic deterioration. The materials HfN, ZrO2 and ThO2 showed potential for dispersion strengthening and were recommended for further development. (Author)

AD-451 245 **Field 11F**
CFSTI Price: HC$8.60
Chemical Labs., Univ. of Indiana, Bloomington.
APPLICATIONS OF IONIC BEAMS TO STUDY OF CORROSION OF METALS BY GASES.
Rept. for 1 Jul 60-15 Aug 63,
by Walter J. Moore, Nguyen Trinh Dzoanh, Sigemaro Nagakura, and Sylvester Brown. Oct 64, 85p
Contract DA-33-008-ORD-1989
AROD-2692:1

Descriptors: (*Metals, Corrosion), (*Corrosive gases, Research program administration), Ion bombardment, Oxygen, Oxidation, Metal films, Foils, Aluminum, Copper, Nickel compounds, Oxides, Reports, Abstracts, Helium, Xenon.

Contents: Effects of atomic oxygen on semiconductor oxides; A self sustaining dipole discharge in oxygen; Corrosion of metal films in an oxygen plasma at high pressure; and Oxidation of aluminum films after ionic bombardment with helium or xenon.

AD-453 415 **Field 11F**
CFSTI Price:: HC$5.60
Army Missile Command, Redstone Arsenal, Ala.
MECHANICAL BEHAVIOR OF HEAT-TREATED AISI 4340 STEEL UNDER BIAXIAL STRESS AND RAPID HEATING,
by C. W. Austin, Jr. Sep 64, 55p RR-TR-64-16
Projs. 1B242104D226, 1A024401A110

Descrptors: (*Steel, Mechanical properties), Heating, Stresses, Tensile properties, Deformation, Plasticity, Strain (Mechanics), Pipes.

Identifiers: Biaxial stress, Steel 4340.

The report presents the results of biaxial stress tests under rapid heating conditions on AISI 4340 steel tubular test specimens heat-treated to a tensile yield strength of 228,000 PSI. The test specimens were subjected to uniaxial tension and to tension-tension biaxial stress ratios of 2:1, 1:1, and 1:2 at effective biaxial stress levels of 150,000, 170,000, and 190,000 PSI and heating rates of 50, 100, and 500 F/sec. In general, increasing the heating rate delays specific amounts of plastic deformation to higher temperatures for all stress levels and biaxial stress ratios. For engineering purposes the biaxial deformation behavior of this material could be predicted from uniaxial tests at plastic strains up to 2 percent for a heating rate of 50 F/sec for stress levels of 170,000 and 190,000 PSI. The biaxial plastic flow of this material could also be predicted from uniaxial data for the 1:1 and 1:2 biaxial stress ratios for all three stress levels for strains of less than 0.5%. (Author)

AD-456 365 **Field 11F**
CFSTI Price: HC$2.00
Hydronautics Inc., Laurel, Md.
HIGH FREQUENCY FATIGUE OF METALS AND THEIR CAVITATION DAMAGE RESISTANCE,
by A. Thiruvengadam. Dec 64, 45p Technical rept. TR-233-6
Contract Nonr-3755 (00)
Proj. NR-062-293

Descriptors: (*Fatigue (Mechanics), Metals), (*Cavitation, Metals), (*Metals, Fatigue (Mechanics)), High frequency, Strain (Mechanics), Corrosion, Plasticity, Resistance, Oscillators, Magnetostriction, Test equipment, Steel, Stainless steel, Nickel alloys, Aluminum alloys, Bronze.

In order to verify the strain rate effects on the correlation between strain energy of metals and their cavitation damage resistance, high frequency fatigue tests at 14.2 kcs were conducted using a magnetostriction oscillator. Utilizing Morrow's theory, it was shown that fatigue at this frequency can be quantitatively predicted if a 15% reduction in static strain hardening factor is made. This result shows that strain rate effects are relatively small when plastic strain energy is used as a criterion. Experiments on corrosion showed fatigue strength can be reduced significantly for SAE 1020 steel in 3% NaCl solution even at high frequencies. (Author)

AD-461 079 **Field 11F, 20B**
CFSTI Price: HC$9.60
United Aircraft Corp., East Hartford, Conn. Research Labs.
INVESTIGATION OF FRACTURE MECHANISMS, THERMAL STABILITY AND HOT-STRENGTH PROPERTIES OF CONTROLLED POLYPHASE ALLOYS.
Final rept., 13 Mar 64-12 Mar 65,
by M. J. Salkind, B. J. Bayles, F. D. George, and W. K. Tice. 12 Apr 65, 97p D910239-4
Contract NOw-64-0433

Descriptors: (*Aluminum alloys, Heat-resistant metals + alloys), (*Composite materials, Heat-resistant metals + alloys), (*Heat-resistant metals + alloys, Aluminum alloys), Eutectics, Copper alloys, Nickel alloys, Fracture (Mechanics), Reinforcing materials, Microstructure, Heat treatment, Creep, Tensile properties, Thermal properties, Stability, Grain structures (Metallurgy), Crystal growth, Phase studies.

The effect of reinforcement size on the room temperature tensile strength of Al-Al13Ni and Al-CuAl2 unidirectionally solidified composites was investigated. Within the range of solidification rates studied (2 to 11 cm/hr), the reinforcement size varied by a factor of two times and no effect of reinforcement size on strength was noted. It was found that the variation of tensile strength with temperature closely parallels the behavior noted for S.A.P. A preliminary investigation of the creep behavior of Al-Al13Ni indicates that the strain rate during the second stage of creep is comparable to that of S.A.P. although the total strain is greater. The preferred crystallography for each system persisted after long times at elevated temperatures. The microstructure of each system was changed significantly only by heat treatment at relatively high temperatures. The stability of the microstructure at elevated temperature varied inversely with the solidification rate. (Author)

AD-640 693 **Field 11F**
Not available from CFSTI.
RIAS, Inc., Baltimore, Md.
STRESS-CORROSION CRACKING OF COPPER,
by E. N. Pugh, W. G. Montague, and A. R. C. Westwood. 1 Feb 66, 3p
AROD-5023:4
Availability: Published in Corrosion Science v6 p345-6 1966.

Descriptors: (*Copper, Fracture (Mechanics)), (*Stress corrosion, Copper).

AD-640 724 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-PattersonAFB, Ohio.
STUDIES OF STEELS AND ALLOYS: SELECTED ARTICLES,
by V. P. Severdenko, R. M. Kalnitskii, V. I. Prosvirin, A. I. Zaitsev, and V. D. Mortikov. 30 Jun 66, 20p FTD-MT-65-383
TT-66-62495
Edited machine trans. of mono. Issledovaniya Staley I Splavov, Moscow, 1964 p114-7, 166-71.

Descriptors: (*Heat-resistant metals + alloys, Mechanical properties), (*Tungsten, Mechanical properties), Plasticity, Tensile properties, Deformation, Cermets, Thermal properties, Aging (Materials), Rupture, Hardness.

Contents: Plasticity and strength of tungsten during short time tests; Influence of working temperatures on properties of alloy E1-437.

AD-640 744 **Field 11F, 20B**
Not available from CFSTI.
Yale Univ., New Haven, Conn. Dept. of Engineering and Applied Science.
X-RAY DIFFRACTION STUDY OF VACUUM-EVAPORATED SILVER FILMS.
Technical rept.,
by T. B. Light, and C. N. J. Wagner. 19 Jul 65, 8p
TR-13
Contract Nonr-609 (43)
Availability: Published in Journal of Vacuum Science and Technology v3 n1 p1-5.

Descriptors: (*Silver, Metal films), (*Metal films, X-ray diffraction analysis), Vapor plating, Vacuum apparatus, Particle size, Strain (Mechanics), Crystal lattice defects, Twinning (Crystallography).

Silver films were prepared by evaporation onto glass substrates held near 130C at different reside-

al gas pressures (10-4 to 10-7 Torr). Powder-pattern peaks of these films (thicknesses 2000A and 6000A) were measured with CuKa radiation at room temperature, and the profiles subjected to a Fourier analysis to determine particle size, strains, and faulting. Films prepared in poorer vacuum (0.0001-0.000001 Torr) show small particle sizes (approximately 500A), very small root-mean-squared strains (approximately 0.0005) and evidence for deformation stacking faults and microtwinning. Lattice parameter measurements indicate the presence of internal strains in films heated to 250C for 2 h and measured at room temperature. (Author)

AD-640 835 **Field 11F, 20K**
CFSTI Prices: HC$1.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Engineering.
RELATION BETWEEN THE PETCH 'FRICTION' STRESS AND THE THERMAL ACTIVATION RATE EQUATION,
by R. W. Armstrong. Oct 66, 6p ARPA-E-35
Prepared in cooperation with ARPA and Oak Ridge Associated Universities.

Descriptors: (*Iron, *Stresses), Strain (Mechanics), Heat of activation, Mathematical analysis.

The discussion is addressed towards establishing a connection between two alternative constitutive equations that have been used in the past to describe the temperature (and strain rate) dependence of the yield stress of iron.

AD-640 916 **Field 11F**
CFSTI Prices: HC$1.60 MF$0.50
Office of Naval Intelligence, Washington, D. C. Translations Section.
BERYLLIUM, CHEMICAL PROCESSING AND METALLURGY,
by G. F. Silina, Yu. I. Zarembo, and L. E. Bertina. 1960, 13p Trans-2156
TT-66-62507
Trans. of mono. Berillii Khimicheskaya Tekhnologiya i Metallurgiya, Moscow, 1960 p103-19.

Descriptors: (*Beryllium, *Refining (Metallurgy)), (*Metallurgy, Beryllium), Beryllium compounds, Fluorides, Salts, Distillation, Vacuum apparatus, Iodides, USSR.

Discusses various methods of processing beryllium such as: obtaining beryllium by the thermal dissociation of beryllium iodide; production of beryllium through electrolysis of molten salts.

AD-640 950 **Field 11F**
Not available from CFSTI.
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
THE MAGNETIC SUSCEPTIBILITY OF SILVER AND GOLD IN THE RANGE 6-300K,
by C. M. Hurd. 26 Apr 66, 5p
NRC-9122
Availability: Published in J. Phys. Chem. Solids v27 p1371-4 1966.

Descriptors: (*Silver, Magnetic properties), (*Gold, Magnetic properties), Measurement, Temperature.

The mass magnetic susceptibility (chi) of polycrystalline samples of Ag and Au has been determined in the range 6-300K by a high-precision Faraday method. Samples with purities ranging to 6N have been measured. It is shown that the observed temperature dependence of (chi) for the 1B metals in the range 6-1000K can be explained in terms of the change in the density of states at the Fermi level produced as a result of the change in the lattice parameter. (Author)

AD-641 089 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania Univ., Philadelphia. Electro-Chemistry Lab.
HYDROGEN EMBRITTLEMENT RESULTING FROM CORROSION, CATHODIC PROTECTION, AND ELECTROPLATING.
Fianl rept., 14 May 65-13 May 6
by E. Gileadi. Sep 66, 35p
Contract N156-46659

Descriptors: (*Hydrogen embrittlement, Electrochemistry), (*Corrosion, Hydrogen embrittlement), (*Cathodic protection, Hydrogen embrittlement), (*Electroplating, Hydrogen embrittlement), Non-destructive testing, Electrodes, Hydrogen, Solubility, Diffusion, Iron alloys, Permeability, Adsorption, Chromium alloys.

A technique was developed and the apparatus built for a fast, nondestructive method for the determination of hydrogen content of large specimen. Also, a study of the basic factors which determine the solubility and the rate of diffusion of hydrogen in metals was undertaken. The approach was to change systematically the metallurgical and physical properties of iron by forming binary alloys of variable composition, and to study the resulting changes in hydrogen diffusion rate and solubility.

AD-641 099 **Field 11F**
Not available from CFSTI.
Maryland Univ., College Park.
OPTICAL PROPERTIES OF THE ALKALI METALS,
by R. A. Ferrell. 1965, 8p
Grant AF-AFOSR-735-65
Proj. AF-9761
Task 976101
AFOSR-66-1824
Availability: Published in Optical Properties and Electronic Structure of Metals and Alloys, Proceedings of the International Colloquium Paris Sep 13-16 1965.

Descriptors: (*Alkali metals, Optical properties), Absorption, Band theory of solids.

A general formulation is presented of the problem of optical absorption in a metal. It is noted that in a perfect lattice the oscillator strength is too weak and does not occur at a sufficiently low frequency to agree with the experimental data on the alkali metals. The 'imperfectness' of the lattice resulting from phonons yields oscillator strength at the lower frequencies, but does not lead to the observed structure. The latter can be characterized as a 'threshold' rather than a 'resonance', and is presumed to be a consequence of Umklapp. It is necessary to extend the Lindhard dielectric function calculation to include the effect of Umklapp on dynamic screening. A crude preliminary attempt in this direction is presented. (Author)

AD-641 157 **Field 11F, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Test Station, China Lake, Calif.
VACUUM EVAPORATION STUDIES OF MERCURY TELLURIDE AND CADMIUM TELLURIDE,
by T. M. Donovan. Oct 66, 11p NOTS-TP-4186
Task R360-FR-106/216-1/R011-01-01

Descriptors: (*Tellurium alloys, *Vapor plating), (*Mercury alloys, Tellurium alloys), (*Cadmium alloys, Tellurium alloys), Vacuum apparatus, Metal films, Semiconducting films, X-ray diffraction analysis.

Identifiers: Mercury telluride, Cadmium telluride.

The conditions of evaporation and the resulting chemical composition have been studied for films of mercury telluride and cadmium telluride. Chemical analysis of the starting materials and the films revealed that the composition of the starting materials was not uniform and that there was little control over the composition of the resulting films. X-ray diffraction studies of evaporated alloy films deposited on glass substrates showed that these films were highly disordered. (Author)

AD-641 180 **Field 11F, 11G**
CFSTI Prices: HC$3.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
MAGNETIC PROPERTIES OF THIN FILMS OF NICKEL-IRON-MOLYBDENUM,
by Guy H. Frindell. 25 May 66, 58p NOLTR-66-101

Descriptors: (*Metal films, Nickel alloys), (*Nickel alloys, Magnetic properties), Iron alloys, Molybdenum alloys, Films, Ferromagnetic materials, Magnetostriction, Anisotropy, Resistance (Electrical), Experimental data.

The properties of thin ferromagnetic films of nickel-iron-molybdenum are studied as a function of composition and method of manufacture. Experimental data are presented and discussed on magnetostriction, anisotropy, dispersion of anisotropy, coercive force, saturation induction, magnetoresistance, and resistance. Many of these results are in general agreement with data published by other authors; the principal exception is the dependence of the coercive force on substrate temperature. (Author)

AD-641 241 **Field 11F, 20B**
Not available from CFSTI.
Clarkson Coll. of Technology, Potsdam, N. Y. Dept. of Physics.
ANISOTROPIC BEHAVIOR OF THE ELASTO-RESISTANCE EFFECT OF IRON SINGLE CRYSTALS,
by M. C. Martin, E. A. Selleck, and G. D. Singer. 13 Sep 65, 4p
Grant AF-AFOSR-794-65
Proj. AF-9763
Task 976301
AFOSR-66-1628
Availability: Published in Journal of Applied Physics v36 n12 p3950-1 Dec 1965.

Descriptors: (*Iron, Resistance (Electrical)), (*Single crystals, Iron), Anisotropy, Differential equations, Elasticity, Deformation, Functions.

The relationship between the elastoresistivity constants of single crystals of iron and the orientation function were examined. The deflection method was used employing a compensated potentiometer circuit and using static loads at room temperature. It was found that this relationship was linear as predicted by Bridgman's theory. The slopes for elastoresistance coefficient and elastoresistivity coefficient versus orientation function are given.

AD-641 262 **Field 11F, 13J, 13H**
CFSTI Prices: HC$4.00 MF$0.75
Naval Research Lab., Washington, D. C.
METALLURGICAL CHARACTERISTICS OF HIGH STRENGTH STRUCTURAL MATERIALS.
Quarterly rept. no. 10,
by R. J. Goode, R. W. Huber, R. W. Judy, Jr., D. G. Howe, and P. P. Puzak. Apr 66, 112p NRL-6454
See also AD-634 094.

Descriptors: (*Titanium alloys, Fracture (Mechanics)), (*Aluminum alloys, Fracture (Mechanics)), (*Steel, Fracture (Mechanics)), (*Submarine hulls, Metal plates), Toughness, Nickel alloys, Maraging steels, Cobalt alloys, Carbon alloys, Chromium alloys, Molybdenum alloys, Vanadium alloys, Niobium alloys, Tantalum alloys, Fatigue (Mechanics), Stress corrosion, Corrosion, Welding, Heat treatment, Tests, Mechanical properties.

A progress report covering the research studies in high strength structural metals conducted in the period December 1965 through March 1966 is presented. The report includes fracture toughness studies on expected normal production 12%-Ni maraging and 9Ni-4Co-0.25C steels, a variety of circular rolled and conventionally rolled titanium

alloys, and aluminum alloys using a standard engineering developed, and linear elastic fracture mechanics type fracture toughness tests. Preliminary correlations of Klc with drop weight tear test energy for a variety of titanium alloys are presented. Low cycle fatigue crack propagation in 12%-Ni maraging steels in air and salt water is described and compared to the behavior of other steels. Also, crack initiation versus propagation failure criteria for low cycle fatigue in air and in aqueous environments is presented for HY-80 and 5Ni-Cr-Mo-V steels and 12%-Ni maraging steels. The stress-corrosion-cracking resistance of a variety of titanium alloys and several aluminum alloys has been determined using a cantilever-bend test; comparison of results obtained in the laboratory and in natural seawater at Key West are presented for a Ti-7Al-2Cb-1Ta alloy. (Author)

AD-641 299 **Field 11F, 20B**
Not available from CFSTI.
Pittsburgh Univ., Pa. Dept. of Physics.
FURTHER STUDIES OF MARTENSITIC TRANSFORMATIONS IN GOLD-COPPER-ZINC AND COPPER-ALUMINIUM-NICKEL ALLOYS.
Revised ed.,
by M. J. Duggin. 8 Jul 65, 9p
Grant AF-AFOSR-196-63
Proj. AF-9761
Task 976101
AFOSR-66-1650
Revision of manuscript submitted 23 May 65.
Availability: Published in Acta Metallurgica v14 p123-9 Feb 1966.

Descriptors: (*Gold alloys, Transformations), (*Copper alloys, Transformations), Martensite, Zinc alloys, Aluminum alloys, Nickel alloys, Phase studies, Crystal structure.

Two martensitic tranformations, which appear to occur thermoelastically in an alloy of gold containing 20.7 wt.% copper and 30.9 wt.% zinc and an alloy of copper containing 14.5 wt.% aluminium and 3.0 wt.% nickel, respectively, have been the subject of further study. The parent and product structures have been re-examined for both alloys and precision lattice parameter measurements have been made for both parent structures. Both transformations convert an ordered beta structure of space group Fm3m to an ordered orthorhombic structure of space group P2mm. It appears that the major distortion occurring during each transformation is a displacement of alternate (110) planes in the beta phase in the (1-10) direction with respect to interleaving planes. The magnitude of this displacement has been determined in the case of each transformation and similarities to analogous transformations in other materials are discussed. (Author)

N66-30078 **Field 11F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SHEAR MODULI OF BORON FILAMENTS.
by H. W. Herring, and V. G. Krishna. Jul 66, 18p NASA-TM-X-1246

Descriptors: *Boron, *Elastic modulus, *Filament, *Shear strength, Beryllium, Composite, Deposition, Dynamic, Elastic, Method, Modulus, Pendulum, Shear, Static, Stiffness, Strength, Structure, Tensile, Torque, Torsion, Twist, Vapor.

For abstract, see STAR 04 17.

N66-30085 **Field 11F**
CFSTI Prices HC$5.00 MF$1.00
Ltv Aerospace Corp., Dallas, Tex.
BIAXIAL STRENGTH CHARACTERISTICS OF SELECTED ALLOYS IN A CRYOGENIC ENVIRONMENT FINAL ENGINEERING REPORT, 6 JAN. 1965 - 6 MAY 1966.
by C. R. Foreman, J. F. Grabinski, and S. W. Mc claren. 6 May 66, 166p NASA-CR-65412
Contract NAS9-3873
Its Rept.-2-53420/6r- 2279

Descriptors: *Cryogenic temperature, *Material testing, *Mechanical property, *Sheet metal, Biaxis, Creep, Cryogenic, Ductility, Energy, Fracture, Material, Mechanical, Metal, Property, Sheet, Strain, Strength, Stress, Temperature, Testing, Theory, Toughness, Uniaxial.

For abstract, see STAR 04 17.

N66-30117 **Field 11F**
CFSTI Prices HC$3.00 MF$0.75
Frankford Arsenal, Philadelphia, Pa. Pitman-dunn Research Labs.
PLANE STRAIN FRACTURE TOUGHNESS AND MECHANICAL PROPERTIES OF 5 AL-2.5 SN ELI TITANIUM AT ROOM AND CRYOGENIC TEMPERATURES FINAL REPORT.
by C. M. Carman, J. W. Forney, and J. M. Katlin. Apr 66, 75p NASA-CR-54296, FA-R-1796
NASA ORDER C-6860A

Descriptors: *Cryogenic temperature, *Fracture toughness, *Mechanical property, *Room temperature, *Titanium alloy, Alloy, Cryogenic, Fracture, Mechanical, Plane, Property, Room, Strain, Temperature, Titanium, Toughness.

For abstract, see STAR 04 17.

N66-30179 **Field 11F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
INFLUENCE OF TIME ON VACUUM VAPORIZATION RATE AND SURFACE COMPOSITIONAL STABILITY OF TANTALUM CARBIDE - HAFNIUM CARBIDE SOLID SOLUTIONS ABOVE 2000 DEG C.
by D. Deadmore. Jul 66, 18p NASA-TN-D-3503

Descriptors: *Hafnium carbide, *Solid solution, *Surface stability, *Tantalum carbide, *Vaporization, Carbide, Composition, Diffraction, Electron, Hafnium, High temperature, Probe, Rate, Solid, Solution, Stability, Surface, Tantalum, Time, Vacuum, X-ray.

For abstract, see STAR 04 17.

N66-30180 **Field 11F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COLD CONSOLIDATION OF METAL PLUS DISPERSOID BLENDS FOR EXAMINATION BY ELECTRON MICROSCOPY.
by W. S. Cremens, G. Reinhardt, and J. W. Weeton. Jul 66, 40p NASA-TN-D-3511

Descriptors: *Alloy, *Metallurgy, *Powdered metal, Agglomeration, Blend, Cold, Consolidation, Density, Dispersion, Electron, Explosive, High energy, Metal, Microscopy, Microstructure, Particle, Powder, Press, Rate, Sheet.

For abstract, see STAR 04 17.

N66-30260 **Field 11F**
CFSTI Prices HC$3.00 MF$0.75
Aerojet-general Corp., Sacramento, Calif.
PROPERTIES OF LARGE 7079 ALUMINUM ALLOY FORGINGS IN A CRYOGENIC ENVIRONMENT.
by F. T. Inouye. Jul 66, 92p NASA-CR-513
Contract NAS3-2555

Descriptors: *Aluminum alloy, *Cryogenic fluid, *Forging, *Inducer, *Liquid propellant rocket engine, *Pump impeller, Alloy, Aluminum, Cryogenic, Hydrogen, Impeller, Liquid, Lox, Mechanical, Oxygen, Propellant, Property, Pump, Rocket engine, Test.

For abstract, see STAR 04 17.

N66-30365 **Field 11F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
SELF-LUBRICATING COMPOSITES OF POROUS NICKEL AND NICKEL-CHROMIUM ALLOY IMPREGNATED WITH BARIUM FLUORIDE - CALCIUM FLUORIDE EUTECTIC.
by H. E. Sliney. 1966, 35p NASA-TN-D-3484
Presented At Ann. Meeting Of The Am. Soc. Of Lubrication Engr., Pittsburgh, 2-5 May 1966

Descriptors: *Barium fluoride, *Calcium fluoride, *Composite material, *Nickel alloy, *Self-lubricating material, Alloy, Barium, Calcium, Chromium, Composite, Deformation, Eutectic, Fluoride, Friction, Impregnation, Material, Nickel, Plastic, Self-lubrication, Strength, Vacuum, Wear, Yield.

For abstract, see STAR 04 17.

N66-30400 **Field 11F**
CFSTI Prices HC$4.00 MF$0.75
North American Aviation, Inc., Los Angeles, Calif.
INVESTIGATION OF LONG-TERM EXPOSURE EFFECTS UNDER STRESS ON SUPERSONIC TRANSPORT STRUCTURAL ALLOYS.
by G. Martin. 1966, 111p NAS-CR-76151, NA-65-24
Contract NASW-921

Descriptors: *Steel structure, *Stress measurement, *Superalloy, *Supersonic transport, *Titanium alloy, Alloy, Brazing, Coating, Corrosion, Effect, Exposure, Measurement, Salt, Steel, Stress, Structure, Supersonic, Titanium, Transport.

For abstract, see STAR 04 17.

N66-31228 **Field 11F**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
TECHNICAL APPLICATIONS FOR OXIDE-DISPERSION STRENGTHENED MATERIALS.
by G. M. Ault, and H. M. Burte. 1966, 68p NASA-TM-X-52225
Presented At Conf. On Oxide Dispersion Strengthening Sponsored By The Am. Inst. Of Mining, Met., And Petroleum Eng., Bolton Landing, N. Y., 27 Jun. 1966

Descriptors: *Dispersion hardening, *High temperature alloy, *Reentry vehicle, *Turbojet engine, Alloy, Aluminum, Conference, Dispersion, Ductility, Engine, Hardening, High temperature, Nickel, Oxidation, Oxide, Processing, Reentry, Refractory, Resistance, Steel, Superalloy, Titanium, Turbojet, Vehicle.

For abstract, see STAR 04 17.

N66-31230 **Field 11F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
CLEANING AND STABILIZATION OF DISPERSION STRENGTHENED MATERIALS.
by M. Quatinetz, and J. W. Weeton. 1966, 35p NASA-TM-X-52228
Presented At Conf. On Oxide Dispersion Strengthening Sponsored By The Am. Inst. Of Mining, Met., And Petroleum Engr., Bolton Landing, N. Y., 27-29 Jun. 1966

Descriptors: *Cleaning, *Dispersion hardening, *Metal oxide, *Powdered metal, *Pressing, Alloy, Aluminum, Conference, Density, Dispersion, Hardening, High temperature, Metal, Metallurgy, Milling, Nickel, Oxide, Powder, Thorium.

For abstract, see STAR 04 17.

N66-31232 Field 11F
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LOW TEMPERATURE THERMAL EXPANSION OF STRUCTURAL METALS.
by J. C. Horton, R. C. Ruff, and C. F. Smith. 18 Apr 66, 38p NASA-TM-X-53436

Descriptors: *Measuring apparatus, *Metal, *Plastic, *Structural material, *Thermal expansion, Alloy, Aluminum, Apparatus, Cryogenic, Expansion, Linear, Material, Measuring, Room, Stainless, Steel, Structural, Temperature, Thermal.

For abstract, see STAR 04 17.

N66-31348 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF ORIENTATION ON DUCTILE TO BRITTLE TRANSITION OF TUNGSTEN SINGLE CRYSTALS.
by R. G. Garlick. Jul 66, 8p NASA-TM-X-1252

Descriptors: *Brittleness, *Ductility, *Single crystal, *Tungsten, *Zone refining, Axis, Crystal, Deformation, Orientation, Plastic, Refining, Single, Temperature, Tensile, Transition, Yield, Zone.

For abstract, see STAR 04 17.

N66-31356 Fiel11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF ALLOYING ON GRAIN REFINEMENT OF ELECTRON-BEAM-MELTED TUNGSTEN.
by W. R. Witzke. Jul 66, 19p NASA-TN-D-3531

Descriptors: *Electron beam, *Melting, *Tungsten alloy, Alloy, Beam, Boron, Carbon, Coefficinet, Compound, Distribution, Electron, Grain, Hafnium, Ingot, Metallurgy, Molybdenum, Powder, Refinement, Refractory, Tungsten.

For abstract, see STAR 04 17.

N66-31382 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Mitron Research And Development Corp., Waltham, Mass.
INVESTIGATION OF THE FIBER REINFORCEMENT OF A COBALT BASE ALLOY FOR APPLICATION AT ELEVATED TEMPERATURE.
by W. E. Lee, R. D. Regan, and R. A. Rosenberg. May 66, 33p NASA-CR-76410
Contract NASW-1365

Descriptors: *Cobalt alloy, *High temperature research, *Silicon carbide, Alloy, Aluminum, Carbide, Cobalt, Fiber, High temperature, Metallography, Oxide, Research, Silicon, Strength, Tensile.

For abstract, see STAR 04 17.

N66-31769 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Little (Arthur D.), Inc., Cambridge, Mass.
THE PEST PHENOMENON IN INTERMETALLICS FINAL REPORT, PERIOD ENDING 4 MAR. 1966.
May 66, 31p NASA-CR-76427
Contract NASW-1167

Descriptors: *Bending fatigue, *Fracture mechanics, *Intermetallics, *Single crystal, Anisotropy, Bending, Brittleness, Crystal, Disilicide, Equation, Failure, Fatigue, Fracture, Loading, Mechanics, Molybdenum, Oxidation, Silicon, Single, Static, Stress, Thermal, Trioxide.

For abstract, see STAR 04 17.

N66-31871 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Mitsubishi Heavy-industries, Ltd., Nagasaki (Japan).
APPLICATION OF MULTIPLE REGRESSION ANALYSIS METHOD TO CUPOLA MELTING OPERATION.
by M. Fukuda, S. Kumagai, H. Mizutani, S. Tomita, and T. Yanagida. 1966, 16p MTB-010036
In Japanese, English Summary Its Tech. Bull. No. 36

Descriptors: *Furnace, *Melting, *Regression analysis, Analysis, Carbon, Cast, Chemical, Content, Iron, Metal, Multiple, Regression, Silicon, Variation.

For abstract, see STAR 04 17.

N66-32186 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Trw Systems, Redondo Beach, Calif.
INVESTIGATION OF TWO-PHASE TUNGSTEN-RHENIUM ALLOYS FOR IONIZER APPLICATIONS, VOLUME II FINAL REPORT.
by M. E. Kirkpatrick, and R. A. Mendelson. Jul 66, 33p NASA-CR-54694, TRW-4429-6012-RO-000, VOL. II
Contract NAS3-7109

Descriptors: *Porous material, *Rhenium alloy, *Tungsten alloy, *Two-phase system, Alloy, Cesium, Composition, Emitter, Ionizer, Material, Microstructure, Phase, Porosity, Rhenium, Suitability, System, Tungsten, Two, Weight.

For abstract, see STAR 04 17.

N66-32264 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Lehigh Univ., Bethlehem, Pa. Inst. Of Research.
INVESTIGATION OF THE SOLIDIFICATION, STRUCTURE AND PROPERTIES OF EUTECTIC ALLOYS INCLUDING CONSIDERATION OF PROPERTIES CONTROL SECOND SEMIANNUAL PROGRESS REPORT.
by R. W. Hertzberg, and R. W. Kraft. 14 Jul 66, 17p NASA-CR-76668
Contract NGR-39-007-007

Descriptors: *Eutectic alloy, *Mechanical property, *Physical property, *Solidification, *Structural stability, Alloy, Aluminum, Bismuth, Copper, Eutectic, Fatigue, High temperature, Mechanical, Metal, Microstructure, Nickel, Niobium, Physical, Property, Stability, Structural, Zinc.

For abstract, see STAR 04 17.

N66-32331 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPATIBILITY OF TANTALUM, COLUMBIUM, AND THEIR ALLOYS WITH HYDROGEN IN PRESENCE OF TEMPERATURE GRADIENT.
by R. G. Galick, and J. R. Stephens. Aug 66, 25p NASA-TN-D-3546

Descriptors: *Hydrogen, *Niobium, *Tantalum, *Temperature gradient, Absorption, Alloy, Compatibility, Embrittlement, Gradient, Nozzle, Nuclear, Rocket, Temperature.

For abstract, see STAR 04 17.

N66-32430 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Dept. of Physics.
THE STRUCTURE OF DI-VALENT AND TRI-VALENT METALS.
by V. Heine, and D. Weaire. 1966, 48p NASA-CR-76750
Grant NSG-352

Descriptors: *Metal, *Perturbation theory, *Potential theory, Aluminum, Atom, Beryllium, Core, First, Ion, Mercury, Order, Perturbation, Potential, Property, Second, Structure, Thallium, Theory, Trivalent, Zero.

For abstract, see STAR 04 17.

N66-32433 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Avco Corp., Tulsa, Okla. Oklahoma Univ. Research Inst., Norman.
SURFACE BLISTERING OF METALS BY ION BOMBARDMENT FINAL REPORT, MAR. 1964 - APR. 1965.
Aug 65, 30p NASA-CR-76757, TR-65-352-F
Contract NASW-720
Prepared Jointly With Okla. Univ. Res. Inst.

Descriptors: *Aluminum, *Ion bombardment, *Proton irradiation, *Surface distortion, Analysis, Annealing, Beam, Blister, Bombardment, Distortion, Energy, Hydrogen, Ion, Irradiation, Mass, Metal, Proton, Surface.

For abstract, see STAR 04 17.

N66-32570 Field 11F
CFSTI Prices HC$2.50 MF$0.75
Washington Univ., Seattle.
STRUCTURE AND VISCOSITY OF MOLTEN BORATES AND PHOSPHATES.
by A. W. Thompson. 1965, 66p NASA-CR-76985
Grant NSG-484

Descriptors: *Borate, *Phosphate, *Silicate, *Viscosity, Calcium, Furnace, Glass, Lead, Liquid, Measurement, Newtonian fluid, Oxide, Potassium, Resistance, Slag, Sodium, Theory, Vacuum.

For abstract, see STAR 04 17.

N66-32616 Field 11F
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COLD REDUCTION AS A MEANS OF REDUCING EMBRITTLEMENT OF A COBALT-BASE ALLOY (L-605).
by L. Leonard, and G. D. Sandrock. Aug 66, 28p NASA-TN-D-3528

Descriptors: *Cobalt alloy, *Cold forming, *Tensile strength, Alloy, Base, Cobalt, Cold, Deformation, Ductility, Embrittlement, Forming, Improvement, Metallurgy, Plasticity, Prior, Reduction, Room, Strength, Temperature, Tensile.

For abstract, see STAR 04 17.

N66-32677 Field 11F
CFSTI Prices HC$2.00 MF$0.50
National Research Corp., Cambridge, Mass. Norton Exploratory Research Div.
A STUDY OF THE ADHESION AND COHESION OF METALS INTERIM SUMMARY REPORT, 9 MAR. 1965 - 9 MAR. 1966.
by M. J. Hordon, and J. R. Roehrig. 1966, 43p NASA-CR-76828
Contract NASW-1168

Descriptors: *Adhesion, *High vacuum, *Metal bonding, Abrasion, Argon, Bombardment, Bonding, Copper, Ductility, High, Ion, Loading, Metal, Vacuum, Xenon.

For abstract, see STAR 04 17.

N66-36853 **Field 11F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY OBSERVATIONS OF THE ENHANCEMENT OF SUPERCONDUCTING CURRENT-CARRYING CAPACITY IN NIOBIUM THROUGH HYDROGEN TREATMENT.
by D. E. Hegland, P. R. Kendziorski, and R. J. Smith. Sep 66, 12p NASA-TN-D-3638
Contract 129-03-15-01-22

Descriptors: *Magnetic field intensity, *Niobium, *Resistance coefficient, *Superconductivity, Capacity, Coefficient, Current, Earth, Field, Hydrogen, Intensity, Magnetic, Measurement, Metal, Rare, Resistance, Temperature, Treatmen.

For abstract, see STAR 04 22.

N66-36926 **Field 11F**
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Dept. Of Metallurgy.
RESEARCH ON MECHANISMS OF ALLOY STRENGTHENING SEMIANNUAL REPORT.
Jun 66, 13p NASA-CR-77719
Grant NSG 117-61

Descriptors: *Alloy, *Metallurgy, Cooling, Dispersion, Dispersion hardening, Electron, Extrusion, Hardening, Liquid, Mechanical, Microscopy, Oxide, Particle, Property, Quenching, Solid, Solubility, State, Strength.

For abstract, see STAR 04 22.

N66-37031 **Field 11F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
MECHANICAL PROPERTIES OF DILUTE TUNGSTEN-RHENIUM ALLOYS.
by W. D. Klopp, P. L. Raffo, and W. R. Witzke. Sep 66, 38p NASA-TN-D-3483

Descriptors: *Mechanical property, *Rhenium alloy, *Tungsten alloy, Alloy, Annealing, Arc, Beam, Bending, Creep, Dilution, Ductility, Electron, Evaluation, Grain, Growth, Mechanical, Melting, Property, Recrystallization, Rhenium, Rod, Sheet, Strength, Tensility, Tungsten.

For abstract, see STAR 04 22.

N66-37039 **Field 11F**
CFSTI Prices HC$2.50 MF$0.75
Pratt And Whitney Aircraft, East Hartford, Conn.
DETERMINATION OF THE EMISSIVITY OF MATERIALS SEMIANNUAL PROGRESS REPORT, 15 NOV. 1965 - 14 MAY 1966.
by R. C. Emanulson, W. L. Luoma, and W. J. Walek. 30 Jun 66, 88p NASA-CR-72058, PWA-2877
Contract NAS3-4174

Descriptors: *Beryllium, *Niobium alloy, *Space radiator, *Stainless steel, *Titanate, *Zirconium alloy, Alloy, Emissivity, Niobium, Plant, Plate, Power, Radiator, Space, Stainless, Steel, Tube, Zirconium.

For abstract, see STAR 04 22.

N66-37137 **Field 11F**
CFSTI Prices HC$5.93 MF$2.75
Israel Program For Scientific Translations, Ltd., Jerusalem.
METALLURGY OF RARE METALS.
by O. E. Krein, G. V. Samsonov, and A. N. Zelikman. 1966, 544p NASA-TT-F-359, TT-65-50137
Transl. Into English Of "metallurgiya Redkikh Metallov" Moscow, Izd. Met., 1964 Published For Nasa And Nsf

Descriptors: *Metallurgy, *Rare earth, Beryllium, Chemical, Compound, Earth, Gallium, Germanium, Lanthanide, Lithium, Metal, Molybdenum, Niobium, Physiochemistry, Production, Rare, Rhenium, Tantalum, Textbook, Thallium, Tungsten.

For abstract, see STAR 04 22.

N66-37365 **Field 11F**
CFSTI Prices HC$3.00 MF$0.75
Arde-portland, Inc., Paramus, N. J.
FEASIBILITY STUDY OF THE USE OF THERMALLY- INDUCED STRAINING FOR GRAIN REFINEMENT IN RECRYSTALLIZED TUNGSTEN FINAL REPORT.
1966, 73p NASA-CR-78165
Contract NASW-1145

Descriptors: *Grain, *Metallurgy, *Strain, *Tungsten, Crack, Ductility, Feasibility, Flux, Formation, Gun, Heat, Plasma, Recrystallization, Refinement, Temperature, Thermal, Use.

For abstract, see STAR 04 22.

N66-37407 **Field 11F**
CFSTI Prices HC$2.00 MF$0.50
Frankford Arsenal, Philadelphia, Pa.
PLANE STRAIN FRACTURE TOUGHNESS OF 2219- T87 ALUMINUM ALLOY AT ROOM AND CRYOGENIC TEMPERATURES.
by C. M. Carman, J. W. Forney, and J. M. Katlin. Aug 66, 43p NASA-CR-54297, FA-R-1821
NASA ORDER C-6860-A

Descriptors: *Aluminum alloy, *Cryogenic temperature, *Fracture toughness, *Room temperature, *Tensile strength, *Yield strength, Alloy, Aluminum, Area, Cryogenic, Elongation, Fracture, Plane, Reduction, Room, Strain, Strength, Temperature, Tensile, Toughness, Yield.

For abstract, see STAR 04 22.

N66-37572 **Field 11F**
CFSTI Prices HC$3.00 MF$0.50
Standard Pressed Steel Co., Jenkintown, Pa.
INVESTIGATION OF ADVANCED HIGH STRENGTH ALLOYS USED IN WEIGHT REDUCTION OF THE SATURN V THRUST STRUCTURE. PHASE I - FEASIBILITY STUDY.
by J. J. Glackin, and E. F. Gowen Jr. 8 Jan 66, 51p NASA-CR-78303
Contract NAS8-20158

Descriptors: *Beryllium alloy, *Fastener, *High strength alloy, Blind, Lightweight, Mechanical, Property, Reduction, Saturn v launch vehicle, Structure, Thrust, Weight.

For abstract, see STAR 04 22.

N66-37578 **Field 11F**
CFSTI Prices HC$2.00 MF$0.50
Avco Corp., Tulsa, Okla. Instrument Div.
A STUDY OF THE BLISTERING OF METAL SURFACES BY SOLAR SYSTEM IONS FINAL REPORT, MAY 1965 MAY 1966.
by J. A. Cooley, and L. H. Milacek. Aug 66, 33p NASA-CR-78313, TR-66-G-106-F
Contract NASW-1203
Prepared In Cooperation With Okla. Univ. Res. Inst.

Descriptors: *Metal surface, *Proton irradiation, *Radiation effect, Aluminum, Blister, Crystal, Deposition, Gold, Ion, Microstructure, Orientation, Oxide, Pit, Removal, Solar, Vapor.

For abstract, see STAR 04 22.

AD-640 535 **See Field 20C**

AD-640 615 **See Field 18H**

AD-640 689 **See Field 20K**

AD-640 736 **See Field 21E**

AD-640 750 **See Field 7D**

AD-640 838 **See Field 20K**

AD-640 920 **See Field 20L**

AD-640 992 **See Field 13M**

AD-641 108 **See Field 7A**

AD-641 109 **See Field 21D**

AD-641 177 **See Field 11C**

AD-641 284 **See Field 13H**

NAA-SR-11879 **See Field 10A**

NLCO-980 **See Field 7D**

11G. MISCELLANEOUS MATERIALS

AD-468 343 **Field 11G**
CFSTI Prices: HC$3.00 MF$0.75
Sperry Microwave Electronics Co., Clearwater, Fla.
LOW MAGNETIC SATURATION GARNETS.
Quarterly rept. no. 1, 1 Feb-30 Apr 65,
by A. D. Sanders, L. R. Hodges Jr, and G. R. Harrison. May 65, 97p
Contract DA-28-043-AMC-01205 (E)
Projs. DA-1C0-24401A112, 1C0-24401A112-02

Descriptors: (*Ferromagnetic materials, Substitutes), Iron compounds, Oxides, Vanadium compounds, Yttrium compounds, Calcium compounds, Single crystals, Crystals, Garnets, Crystal growth.

Identifiers: Ferrimagnetic materials.

A single crystal formulation of Bi (3-2y)Ca2yVyFe (5-y)O12 for y = 1.2 has been optimized in which good yield and quality of crystals were obtained. Firing temperature schedules have been established for polycrystalline Y (3-2x)Ca2xVxFe (5-x)O12 and Bi (3-2y)Ca2yVyFe (5-y)O12 from x = 0.5 to x = 1.5 and from y = .7 to y = 1.5. Detailed data on the different formulations and the different processes tried are contained in the report, together with an analysis of the most important parameters which determine the quality of the finished material. A summary of the results of previous investigations on garnets containing pentavalent vanadium is presented for background information. (Author)

AD-640 580 **Field 11G, 19F**
CFSTI Prices: HC$3.00 MF$0.75
Naval Weapons Plant, Washington, D. C.
DEVELOPMENT AND EVALUATION TESTS OF VARIOUS THERMAL INSULATING MATERIAL.
Test rept.
1952, 75p NGF-T-38-51
NAVORD-1636
Availability: Microfiche only after original copies exhausted.

Descriptors: (*Thermal insulation, *Gun mounts), Naval ordnance, Glass textiles, Vinyl plastics, Expanded plastics, Sheets, Coatings, Performance (Engineering), Experimental data, Tests.

None of the four non vinyl sponge materials tested are considered suitable for application in insulating gun mount shields. Three samples failed under shock test and the fourth became soft at a temperature of 150 F. Only one of the vinyl sponge sam-

ples, U.S. Rubber Co. Ensolite 312-1 with U-Sement 512, is suitable for application in insulating gun mount shields. This material meets the requirements of Miliary Specification R-MIL-I-16562 (BuOrd). Plastic 52-C-44-II Coating, Strippable Spray Type (Adhering Type II) is a satisfactory coating for use with insulating materials. It seals in all objectionable odors present in the insulating materials and provides a neat appearing, tough but pliable surface which can take more wear and abuse than the surface of the insulating material. It maintains a very good bond with all vinyl sponge materials tested.

AD-640 723 **Field 11G, 11I, 11B, 13H K**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
LAMINAR PLASTIC AND GLASS PLASTIC FOR ELECTRICAL INDUSTRY,
by G. B. Shalun. 27 Jun 66, 43p FTD-MT-64-379 TT-66-62494
Sloistye Plastiki i Stekloplastiki dlya Elektrotekhnicheskoi Promyshlennosti, edited machine trans., Leningradskii Dom Nauchno-Tekhnicheskoi Propagandy. Obmen Peredovym Opytom. Seriya Sinteticheskie Materialy (USSR), v7 28p 1962.

Descriptors: (*Laminates, Electrical industry), USSR, Laminated plastics, Glass textiles, Paper, Textiles, Plastics, Electric insulation, Manufacturing methods, Binders, Impregnation.

Contents: Brief data on equipment for producing laminar plastics: (1) preparation of binders, (2) impregnation and lacquering of fillers, (3) processing impregnated or varnished fillers; Laminar plastics based on paper and fabric: laminated insulation, electrical textolite, cylinder and tube electrical paper-bakelites; High-strength electric insulating materials - fiber-glass laminates: fiber glass laminate electrical sheet, brand ST, fiber glass laminate STU, heat-resistant fiber glass laminates STK-41 and STK-71, fiber glass laminate STK-41/EP, fiber glass laminate STEF, sheet glass plastic SVAM - a highly durable construction and electric insulating material, rectilinear cutting, figure cutting, sharpening, milling, drilling, flat grinding.

AD-640 829 **Field 11G**
CFSTI Prices: HC$6.00 MF$1.25
Cruft Lab., Harvard Univ., Cambridge, Mass.
FERROMAGNETIC RESONANCE MEASUREMENTS OF MAGNETOELASTIC CONSTANTS,
by Alan B. Smith. Jan 66. 234p Scientific-12-Ser-3
Contract AF 19 (628)-3874
Proj. AF-5635
Task 563503
AFCRL-66-345

Descriptors: (*Ferromagnetic materials, *Magnetic resonance), (*Magnetostriction, Ferromagnetic materials), (*Anisotropy, Ferromagnetic materials), Nickel compounds, Iron compounds, Oxides, Cobalt compounds, Yttrium compounds, Garnet, Doping, Ytterbium, Erbium, Measurement.

A new method of measuring magnetoelastic constants is described which utilizes the strain dependence of ferromagnetic resonance. The magnetoelastic constants obtained using this method are presented for NiFe204, Co (.05)Ni (.95)Fe204, Yb (.1)Y (.9)IG, YIG, and Er (.1)Y (.9)IG. Most of these measurements cover the 4K to 300K temperature range. The results of anisotropy and linewidth measurements on all but the last two of these materials are also given. A comparison of all these results with the predictions of existing theories of magnetostriction, anisotropy, and linewidth is also included. The possibility of using the strain dependence of ferromagnetic resonance as the basis for certain microwave devices is also discussed. (Author)

AD-641 143 **Field 11G, 20C**
CFSTI Prices: HC$1.00 MF$0.50
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
GALVANOMAGNETIC INTERACTIONS IN FERROMAGNETIC RESONANCE,
by L. M. Silber, and H. M. Stark. 27 May 66, 9p PIBMRI-1337-66
Contract AF 49 (638)-1402, Grant NSF-GP-753
Proj. AF-4751
AFOSR-66-2355

Descriptors: (*Ferromagnetic materials, Magnetic properties), Films, Nickel, Nickel alloys, Iron alloys, Magnetic resonance, Magnetism.

A new method has been developed for studying the galvanomagnetic as well as the magnetic properties of ferromagnetic materials. The method has been applied to thin films of nickel and permalloy and has yielded results for the conductivity, magnetoresistance anisotropy, extraordinary Hall coefficient, saturation magnetization, and magnetic relaxation time in these materials at microwave frequencies. The new method consists of measuring the second harmonic signal generated by galvanomagnetic interactions when an electromagnetic wave is incident on a magnetized conducting ferromagnetic film. In a ferromagnetic material, the relationship between current density and the applied electric fields takes the usual form of Ohm's Law with second and third termis due to galvanomagnetic effects. The measurement of the microwave galvanomagnetic properties of ferromagnetic materials by the second harmonic method has an advantage over the measurement of the dc signal in that two measurements can be made - the magnitude and phase of the galvanomagnetically-induced signal. The process of extracting the material parameters from the measured data is thus greatly simplified. In addition, the method has been shown to be a sensitive probe of the state of magnetization in thin films. It can be extended to study in greater detail films with spacial variations in magnetization, as in standing spin waves, non-linearities in the magnetization at high powers, as well as galvanomagnetic effects in magnetic semiconductors or paramagnetics. (Author)

PB-173 369 **Field 11G, 13B**
CFSTI Prices: HC$6.00 MF$1.25
Ohio State Univ., Columbus. Transportation Engineering Center.
DURABILITY CHARACTERISTICS OF ASPHALTIC MATERIALS.
Interim rept.,
by Fred Moavenzadeh, and Richard R. Stander Jr. Jun 66, 247p EES-259-1, 0573
Proj. EES-259
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Asphalt, Mechanical properties), Rheology, Roads, Viscosity, Aging (Materials), Chemical analysis, Molecular weight.

The work included: (a) The rheologic analysis of the flow behavior of three asphalts under different shear rates and at various temperatures. (b) The use of three viscosity measuring instruments to obtain rheologic properties over a wide range of temperature and shear rate. (c) The aging of the asphalts tb different levels and the determination of their flow behavior. (d) The application of various rheologic models, including especially the hyperbolic sine model, to the flow of asphalt. (e) The chemical separation of the asphalts into asphaltene and maltene components and the determination of aging effects on these components. (f) The measurement of intrinsic viscosity of the aged and unaged asphalts and their components to determine the effects of aging on composition and molecular weight. (g) A limited study of tests such as glass transition and direct molecular weight. (Author)

PB-173 370 **Field 11G, 5B, 13B**
CFSTI Prices: HC$2.00 MF$0.50
Materials Research and Development, Inc., Oakland, Calif.
INSTRUCTION MANUAL FOR USE OF THE ASPHALT PUNCH CARD FILE.
1 Jul 66, 41p Rept. no. 0555
Contract CPR-11-3698

Descriptors: (*Asphalt, Information retrieval), (*Information retrieval, Instruction manuals), (*Punched cards, Instruction manuals), Cements, Roads, Physical properties, Chemical properties, Viscosity, Data storage systems, Experimental data, Penetration, Coding.

A punch card file was designed and organized to permit a rapid and easy means of storage and retrieval of test data on the physical and chemical properties of asphalt cements. Coding on the cards includes data by empirical measurements for penetration at 77F, penetration ratio at 39.2/77F, and percent retained penetration, ductility at 60 and 77F of the thin-film oven test residue. Also coded are fundamental measurements for viscosity at 60, 77, 140 and 275F, temperature and shear susceptibilities, the viscosity at 60F and the viscosity ratio of the thin-film oven test residue at 140F. Other parameters which allow for sorting of the asphalts pertain to compositional analysis, molecular weights of the principle components, xylene equivalence, Rostler parameter and average abrasion loss. All of these parameters were coded along the edges of the cards for easy and rapid sorting. The face of the card provides for recording all coded as well as supplemental data on asphalt properties. (Author)

AD-640 694 **See Field 7E**

AD-640 737 **See Field 20B**

AD-640 739 **See Field 20B**

AD-641 032 **See Field 20F**

AD-641 180 **See Field 11F**

AD-641 199 **See Field 13A**

AD-641 271 **See Field 7E**

11H. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

N66-32682 **Field 11H**
CFSTI Prices HC$2.50 MF$0.50
Martin Co., Baltimore, Md.
DEVELOPMENT TEST REPORT FOR SATURN V HYDRODYNAMIC SUPPORT.
by R. Frost. Nov 65, 56p NASA-CR-76911, ER-14037

Descriptors: *Control valve, *Fluid mechanics, *Function test, *Hydrodynamics, *Saturn v launch vehicle, Air, Bearing, Capillary, Component, Contact, Control, Float, Flow, Fluid, Function, Hydraulic, Interface, Mechanics, Oil, Pressure, System, Test, Thermistor, Valve.

For abstract, see STAR 04 17.

AD-641 107 **See Field 21D**

AD-641 189 **See Field 13I**

11I. PLASTICS

AD-235 624 **Field 11I, 6R**
CFSTI Price: HC$1.60
New York Naval Shipyard, Brooklyn. Material Lab.
A MOLDED SKIN SIMULANT MATERIAL WITH THERMAL AND OPTICAL CONSTANTS APPROXIMATING THOSE OF HUMAN SKIN.
Final research rept.,
by Ralph C. Maggio. 23 Aug 56, 11p
Proj. 5046-3
AFSW/1007

Descriptors: (*Skin, Simulation), (*Thermal radiation, Burns), Thermal properties, Optical properties, Clothing, Plastics, Thermosetting plastics, Molding materials.

A material was developed for use as a substitute for human skin in the study of flash burns behind fabrics exposed to the thermal energy of a nuclear detonation. This material, which approximates closely the significant optical and thermal constants of skin, and which has been designated as 'NML BS Skin Simulant', is made by compression molding of a mixture containing six parts of an alpha-cellulose-filled urea formaldehyde molding compound and four parts of silica powder. The validity of this skin simulant has been established by subjecting the simulant and human skin to identical thermal insults when uncovered and when covered with an opaque clothing assembly. The thermal responses of both media in terms of temperature histories were in good agreement. (Author)

AD-641 179 **Field 11I**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
THE EFFECT OF EPOXY RESIN AND CURING AGENT STRUCTURE ON ABLATIVE PROPERTIES.
Interim rept., Jul 64-Jul 65,
by Gerald J. Fleming. 12 Sep 66, 32p NOLTR-66-124
Proj. RRMA-03-043/212-1/R007-04-01

Descriptors: (*Epoxy plastics, *Ablation), Aging (Materials), Additives, Amines, Anhydrides, Thermogravimetric analysis, Cross-linking (Chemistry), Spectra (Infrared), Pyrolysis, Combustion products, Impurities, Molecular structure.

Identifiers: Curing agents.

The reported is the second phase of a correlation of the chemical and physical properties of a polymer with its ablative properties (See AD-467 049 for phase I). Epoxide resins and curing agents were employed as model systems. Thermogravimetric analysis, cross-link density studies, infrared spectroscopy and 'alpha-rod' testing in the oxyacetylene burner facility were employed in the evaluation of the various systems. Amine cured epoxide structures produced high char rates (7.1 to 21.0 mils/sec) and low times to 200C (33 to 47 sec). Certain anhydride cured epoxides, namely methyl bicyclo (2.2.1) heptene-2,3-dicarboxylic anhydride (NMA) and 3,3',4,4'-benzophenone tetracarboxylic dianhydride (BTCD) were found to give good performance with low char rates (2.2 to 5.0 mils/sec) and high times to 200C (91 to 101 sec). Epoxides with a polyphenyl backbone gave the best overall performance, although resorcinol diglycidyl ether performed well also. Resin purity was found to be fairly critical in regard to ablative performance. (Author)

AD-76 914 **Field 11I, 6R**
CFSTI Price: HC$3.60
New York Shipyard, Brooklyn. Material Lab.
A REVIEW OF THE DEVELOPMENT OF A PLASTIC PHYSICAL SKIN SIMULANT FOR EVALUATING SUB-FABRIC FLASH BURNS.
Final research rept.,
by T. I. Monahan, and W. L. Derksen. 22 Jul 55, 35p
Proj. 5046-3

Descriptors: (*Skin, Simulation), (*Burns, Skin), (*Radiation injuries, Skin), Thermal properties, Optical properties, Thermal radiation, Clothing, Polyethylene plastics, Coatings, Swine.

A physical skin simulant was developed for evaluating flash burns behind fabric systems. Studies were made in the following areas: (1) Measurement of some thermal and optical constants of skin, and computation of the skin temperatures associated with burns. (2) Development of a thin-film coating to use with the black polyethylene or other skin simulant to approximate the constants of skin. (3) Use of the coated polyethylene skin simulant to predict burn severities as compared to porcine skin when covered with various fabric systems. (4) Development of the so-called ideal skin simulant having the thermal and optical characteristics of human skin. (5) Feasibility of using passive indicators with a physical skin simulant.

N66-30490 **Field 11I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPATIBILITY OF POLYMERIC MATERIALS WITH FLUORINE AND FLUORINE-OXYGEN MIXTURES.
by L. H. Gordon, L. M. Russell, and H. W. Schmidt. Jun 66, 41p NASA-TN-D-3392

Descriptors: *Fluorine-liquid oxygen (flox), *Material testing, *Polymer chemistry, *Surface reaction, Chemistry, Dynamics, Fluorine, Liquid, Material, Mixture, Oxygen, Plastics, Polymer, Propellant, Reactivity, Statics, Surface, Test.

For abstract, see STAR 04 17.

N66-31165 **Field 11I**
CFSTI Prices HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
ORGANOMETALLIC MATERIALS FOR SPACECRAFT USE FINAL REPORT.
by J. Heller. 13 Dec 65, 36p NASA-CR-75451
Contract NAS5-9617

Descriptors: *Additive, *Organometallic compound, *Potting compound, *Thermal conductor, *Unmanned spacecraft, Adhesive, Aluminum, Compound, Conductor, Electric, Epoxy, Measurement, Metal, Organometallic, Polymer, Potting, Powder, Resistivity, Spacecraft, Structure, Thermal, Unmanned.

For abstract, see STAR 04 17.

N66-32289 **Field 11I**
CFSTI Prices HC$2.00 MF$0.50
Case Inst. Of Tech., Clevelan, Ohio. Polymer Science Group.
MORPHOLOGICAL STUDIES OF POLYETHYLENE TEREPHTHALATE, PART III STATUS REPORT, OCT. 31, 1965 - APR. 30, 1966.
by P. H. Geil, and G. Yeh. 1966, 39p NASA-CR-76738
Contract NGR-36-003-054

Descriptors: *Electron microscopy, *Polyethylene terephthalate, Annealing, Bulk, Crystal, Crystal structure, Electron, Epitaxy, Glass, Lamella, Microscopy, Morphology, Polyethylene, Spherule, Strain, Structure, Surface, Terephthalate.

For abstract, see STAR 04 17.

N66-32290 **Field 11I**
CFSTI Prices HC$2.00 MF$0.50
Case Inst. Of Tech., Cleveland, Ohio. Polymer Science Group.
INFRARED STUDIES OF THE ORIENTATION PROCESS IN POLYETHYLENE TEREPHTHALATE, PART II STATUS REPORT, OCT. 31, 1965 - APR. 30, 1966.
by S. Cornell, and J. L. Koenig. 1966, 35p
NASA-CR-76737
Contract NGR-36-003-054

Descriptors: *Crystal structure, *Infrared spectrophotometer, *Polyethylene terephthalate, Annealing, Biaxis, Crystal, Dependence, Drawing, Film, Glass, Infrared, Orientation, Polyethylene, Spectrophotometer, Stretch, Structure, Terephthalate, Thermal, Transition.

For abstract, see STAR 04 17.

N66-37581 **Field 11I**
CFSTI Prices HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile And Space Div.
ENHANCEMENT OF THE TRANSVERSE PROPERTIES OF FIBROUS COMPOSITES FINAL REPORT.
by N. F. Dow. Feb 66, 46p NASA-CR-78307, R66SD36
Contract NASW-1144
Presented At The 21st Ann. Meeting Of The Reinforced Plastics Div., Soc. Of The Plastics Ind., Chicago, 8-10 Feb. 1966

Descriptors: *Composite material, *Elastic constant, *Filament, *Reinforced plastic, *Reinforcing fiber, Analysis, Binder, Ellipticity, Enhancement, Epoxy, Glass, Method, Property, Reinforced, Stiffness, Transverse, Triangle.

For abstract, see STAR 04 22.

AD-640 547 **See Field 7C**

AD-640 548 **See Field 7C**

AD-640 549 **See Field 7C**

AD-640 551 **See Field 7C**

AD-640 552 **See Field 7C**

AD-640 553 **See Field 7C**

AD-640 554 **See Field 7C**

AD-640 563 **See Field 7D**

AD-640 564 **See Field 7D**

AD-640 566 **See Field 7C**

AD-640 689 **See Field 20K**

AD-640 707 **See Field 13J**

AD-640 723 **See Field 11G**

AD-641 280 **See Field 7C**

PB-173 053 **See Field 6E**

PB-173 353 **See Field 13B**

11J. RUBBERS

AD-641 108 **See Field 7A**

PB-173 053 **See Field 6E**

11K. SOLVENTS, CLEANERS, AND ABRASIVES

AD-640 544 **See Field 13B**

11L. WOOD AND PAPER PRODUCTS

AD-641 168 **Field 11L, 13I**
CFSTI Prices: HC$3.00 MF$0.75
Naval Civil Engineering Lab., Port Hueneme, Calif.
STATIC AND DYNAMIC PROPERTIES OF FIRE-RESISTANT WOODEN STRUCTURAL ELEMENTS.
Final technical rept. Jul 65-May 66,
by F. E. Brink. Oct 66, 70p TR-R-485
Proj. Y-R009-03-01-006

Descriptors: (*Wood, Fire resistant materials), (*Structural parts, Wood), Plywood, Loading (Mechanics), Beams (Structural), Panels (Structural), Dynamics, Protective treatments, Impregnation, Mechanical properties, Structural properties.

A series of treated and untreated laminated Douglas fir beams and plywood panels were subjected to static and dynamic loads to study the effects of pressure-impregnation with fire-retardant chemicals on the mechanical properties of wood and to extend the existing knowledge of the dynamic properties of wood. Results from the beam tests indicate that designs should be based on use under wet conditions when large timbers are to be pressure-impregnated with fire-retardant chemicals; this is because of the hygroscopic nature of treated lumber. It was also found that the allowable static design load can be applied dynamically without damage to the beam. Ultimate resistance of dry untreated beams to dynamic loads was about 1.6 times the allowable design load for dry wood; for treated beams, the ultimate resistance to dynamic loads was about 1.4 times the allowable design load for wet lumber. Results from the plywood shear tests indicate that fire-retardant treatments reduce the mechanical properties of plywood in shear and that the reduction is proportional to the amount of salt retained in the wood. (Author)

N66-30120 **Field 11L**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
ENVIRONMENTAL AND PHYSICAL EFFECTS ON THE RESPONSE OF BALSA WOOD AS AN ENERGY DISSIPATOR.
by A. C. Knoell. 15 Jun 66, 37p NASA-CR-76112, JPL-TR-32-944
Contract NAS7-100

Descriptors: *Energy dissipation, *Spacecraft landing, *Wood, Balsa, Dissipation, Effect, Energy, Environment, Landing, Lunar, Physical, Planetary, Protection, Spacecraft, Static, Test.

For abstract, see STAR 04 17.

PB-173 352 **Field 11L**
CFSTI Prices: HC$1.00 MF$0.50
Texas Transportation Inst., Texas A and M Univ., College Station.
IMPACT LOAD-DEFORMATION PROPERTIES OF PILE CUSHIONING MATERIALS.
Research rept.,
by T. J. Hirsch, and Thomas C. Edwards. May 66, 19p RR-33-4, 369
Proj. 2-5-62-33
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Civil engineering, Deformation), (*Deformation, Impact tests), Construction, Stresses, Statics, Mechanical properties, Mathematical analysis, Mechanical waves, Plywood, Asbestos, Equations.

Identifiers: Pile driving, Piles (Structural).

The report presents the results of tests made to determine the dynamic load-deformation properties of various pile cushion materials. These properties are necessary for the wave equation analysis and have a most significant effect on the driving stresses and pile penetration during driving. Two groups of materials were tested, wood and synthetics. The woods tested were pine and fir plywoods, gum and green oak. The synthetics were Micarta and Garlock Asbestos packing. The testing program consisted of determining the properties of the materials under impact load and also performing cyclic static loads on the cushions. Equations are presented for determining the maximum compressive stress at a pile head during driving.

12A. MATHEMATICS AND STATISTICS

AD-640 592 **Field 12A, 15G**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
THE STATUS OF DEVELOPMENTS IN THE THEORY OF STOCHASTIC DUELS - II.
Technical memo.,
by C. J. Ancker Jr. 28 Sep 66, 35p SP-1017/008/01
See also AD-450 774.

Descriptors: (*Game theory, *Stochastic processes), (*War games, Lanchester equations), Military strategy.

The paper contains a brief outline of the history and the principal features of the Theory of Stochastic Duels, as well as the major analytical results to date. Areas for future research and possible fields of application are also considered. The connection with other models of combat, such as Lanchester's equations and games of strategy, is discussed. An annotated bibliography is included. (Author)

AD-640 645 **Field 12A, 4A**
CFSTI Prices: HC$3.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
FINITE-DIFFERENCE EXPERIMENTS WITH A SIMPLE CONSERVATION LAW.
Physical and mathematical sciences research papers,
by Louis Berkofsky, and Ralph Shapiro. Aug 66, 54p AFCRL-PMSRP-257, AFCRL-66-537
Proj. AF-8604
Task 860404

Descriptors: (*Difference equations, *Differential geometry), Numerical analysis, Integration, Partial differential equations, Atmospheric motion.

Identifiers: Lax-Wendroff scheme.

The authors applied a number of versions of the Lax-Wendroff scheme to obtain solutions of the finite-difference form of a simple conservation law. The principal results, deduced from a large number of numerical experiments, are that the stability of the solutions is highly correlated with the initial conditions, and that the use of a smoothing operator together with the Lax-Wendroff scheme gives the most satisfactory results. (Author)

AD-640 663 **Field 12A**
Not available from CFSTI.
Naval Ordnance Test Station, China Lake, Calif.
A FIXED POINT THEOREM FOR CONNECTED MULTI-VALUED FUNCTIONS,
by Raymond E. Smithson. Sep 66, 11p NOTS-TP-4175
Prepared for presentation at American Mathematical Society April 18, 1964.
Availability: Published in American Mathematical Monthly v73 n4 Pt1 p351-5 Apr 1966.

Descriptors: (*Theorems, *Functional analysis), (*Topology, Functional analysis), Mapping (transformations).

Identifiers: Fixed point theorem.

Let X be a tree and F:X approaches X a multivalued function on X into X. If F is point closed, if the image of each connected set is connected, and if the inverse of each connected set is connected, then F has a fixed point. Examples are given which show that F is not necessarily upper semi-continuous nor lower semi-continuous. (Author)

AD-640 673 **Field 12A**
Not available from CFSTI.
Ford Motor Co., Dearborn, Mich.
ASYMPTOTIC EFFICIENCIES OF THE MOMENT ESTIMATORS FOR THE PARAMETERS OF THE WEIBULL LAWS,
by Satya D. Dubey. 7 May 63, 25p
Prepared for presentation at the Eastern Regional Meeting of the Institute of Mathematical Statistics, Cambridge, Mass., May 6-7, 1963.
Availability: Published in Naval Research Logistics Quarterly v13 n3 p265-88 Sep 1966.

Descriptors: (*Statistical distributions, *Asymptotic series), Probability, Statistical functions.

Identifiers: Weibull distribution.

In the paper the asymptotic properties of the moment estimators (MEs) for the location and the scale parameters of the Weibull law, based on its first two sample moments, are investigated. Previously, the author has obtained maximum likelihood estimators (MLEs) for these parameters and has further derived the asymptotic covariance matrix of these estimators which exists when the shape parameter of the Weibull law is greater than two (1962). This result has been used here to compute the joint asymptotic efficiency of the moment estimators (MEs) of the location and the scale parameters. It has been shown that their joint asymptotic efficiency depends upon only the shape parameter of the Weibull distribution. A table has been presented in this paper which provides the joint asymptotic efficiency of the MEs of the location and the scale parameters of the Weibull distribution for various values of its shape parameter. The maximum value of such a joint asymptotic efficiency is found to be 93.18 percent for the shape parameter equal to 4.6. Also presented in this paper are tables for the following asymptotic efficiencies: (a) the asymptotic efficiency of the ME of the location parameter when the scale parameter is unknown; (b) the asymptotic efficiency of the ME of the scale parameter when the location parameter is unknown; (c) the asumptotic efficiency of the ME of the location parameter when the scale parameter is known; and (d) the asymptotic efficiency of the ME of the scale parameter when the location parameter is known. (Author)

AD-640 674 **Field 12A**
Not available from CFSTI.
Hebrew Univ., Jerusalem (Israel).
A BASIS FOR THE MECHANIZATION OF THE THEORY OF EQUATIONS,
by A. Robinson. 1961, 7p
Prepared in cooperation with Princeton Univ., N. J.
Availability: Published in Studies in Logic and the Foundations of Mathematics p95-9.

Descriptors: (*Equations, Theory), Israel.

The elementary theory of equations expressed within the framework of an appropriately designed deductive calculus provides a good subject for mechanization. It is easy to generalize the theory e.g. by the introduction of inequalities.

AD-640 679 **Field 12A**
Not available from CFSTI.
California Univ., Santa Barbara.
AN INEQUALITY FOR THE ELEMENTARY SYMMETRIC FUNCTIONS OF CHARACTERISTIC ROOTS,
by Marvin Marcus, and Henryk Minc. 16 Jul 65, 9p
Grants AF-AFOSR-698-65, AF-AFOSR-432-63
Proj. AF-9749
Task 974901
AFOSR-66-1676
Availability: Published in Proceedings of the American Mathematical Society v17 n2 p510-14 Apr 1966.

Descriptors: (*Inequalities, *Functions), Matrix algebra, Determinants, Complex numbers.

AD-640 687 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.

A NEW APPROACH TO THE NUMERICAL SOLUTION OF A CLASS OF LINEAR AND NON-LINEAR INTEGRAL EQUATIONS OF FREDHOLM TYPE,
by Richard Bellman. Oct 66, 9p RM-4762-PR
Contract AF 49 (638)-1700

Descriptors: (*Integral equations, *Numerical analysis), Algebra, Theory.

A description is given of a new technique for the numerical integration of Fredholm integral equations. The approach appears to possess advantages in the case where k (u, v) > or = 0. The reader familiar with the theory of invariant imbedding, particularly its application to radiative transfer, will understand the motivation for the method, which can be applied with equal ease to various classes of nonlinear integral equations. (Author)

AD-640 690 **Field 12A**
Not available from CFSTI.
Ford Motor Co., Dearborn, Mich.
ON SOME STATISTICAL INFERENCES FOR WEIBULL LAWS,
by Satya D. Dubey. 10 Sep 62, 26p
Prepared for presentation to the annual meeting of the American Statistical Association held in Minneapolis, Minnesota, on September 10, 1962.
Availability: Published in Naval Research Logistics Quarterly v13 n3 p227-51 Sep 1966.

Descriptors: (*Decision theory, *Statistical distributions), Probability, Statistical functions.

Identifiers: Weibull distribution.

The author considers (a) the problem of obtaining the maximum likelihood estimators (MLEs), including the BAN (Best Asymptotically Normal) estimators, of all the parameters of the various Weibull laws; (b) their asymptotic properties; (c) some further investigations into the properties of the MLEs for all the one-parameter Weibull laws; (d) some large sample tests of hypotheses and the construction of confidence regions of meaningful parametric functions; and (e) the problem of obtaining a closer approximation to the approximate confidence interval for the location parameter.

AD-640 726 **Field 12A, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
JOURNAL OF COMPUTER MATHEMATICS AND MATHEMATICAL PHYSICS. VOL. 4, NO. 3, 1964: SELECTED ARTICLES,
by P. P. Koryavov, and A. S. Fonarev. 24 Jun 66, 43p FTD-MT-65-582
TT-66-62497
Edited machine trans. of Zhurnal Vychislitelnoi Matematiki i Matematicheskoi Fiziki (USSR), v4 n3 p495-511, 604-10 1964.

Descriptors: (*Mathematics, Periodicals), (*Physics, Periodicals), (*Fluid mechanics, *Numerical analysis), Jet mxing flow, Turbulence, One-dimensional flow, USSR.

Contents: Numerical Calculation of Turbulent Mixing of Two Homogeneous Gas Fluxes, by P. P. Koryavov; Method of Numerical Calculation and Solution of the Problem of Dispersion of a Flat Layer of Gas During Gradual Nonuniform Energy Release, by A. S. Fonarev.

AD-640 751 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.50
Maryland Univ., College Park. Inst. for Fluid Dynamics and Applied Mathematics.
TAUBERIAN TRANSLATION ALGEBRAS.
Technical note,
by John J. Benedetto. Mar 66, 51p BN-441
Contract Nonr-595 (17), Grant NSF-GP-4921

Descriptors: (*Algebras, *Topology), Fourier analysis, Series, Polynomials.

In this paper the author extends the translation of convolution property of L (1) (that is, tau (f*g) ... tau f*g : f*tau g) to more general topological algebras, and determine conditions under which the closure of the set of translates of an element is the whole algebra. Applications of this procedure to algebras of distributions and for approximating elements of an algebra by differential polynomials (of a given element) serve as motivation for such a generalization; along with the observation of the importance in proving Tauberian results of Weiner's theorem on the inversion of absolutely convergent Fourier series.

AD-640 766 **Field 12A**
Not available from CFSTI.
Ford Motor Co., Dearborn, Mich.
HYPER-EFFICIENT ESTIMATOR OF THE LOCATION PARAMETER OF THE WEIBULL LAWS,
by Satya D. Dubey. 1964, 15p
Availability: Published in Naval Research Logistics Quarterly v13 n3 p253-64 Sep 1966.

Descriptors: (*Statistical distributions, Reliability), Probability, Statistical functions.

Identifiers: Weibull distribution.

In the paper the author obtained the hyper-efficient estimator of the location parameter of the Weibull laws when it is known a priori that their shape parameters fall within the semiclosed unit interval, (0,1). The existence of such a desirable estimator for the location parameter has been further exploited toward obtaining the maximum likelihood estimators for the scale and shape parameters of all possible Weibull laws. Their asymptotic properties are also discussed. Some other estimators have been proposed for the location parameter when the shape parameter is larger than one. A useful property of the Weibull distribution is also stated in the paper. (Author)

AD-640 774 **Field 12A**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass. Dept. of Mathematics.
ON FINITE DESARGUESIAN PLANES. I,
by Richard Brauer. 29 Apr 65, 8p
Contract AF 49 (638)-1381
Proj. AF-9749
Task 974902
AFOSR-66-1381
Availability: Published in Math Zeitschr v90 p117-23 1965.

Descriptors: (*Projective geometry, *Groups (Mathematics)), Theory.

A Desarguesian projective plane II determines its group G of projectivities. Conversely, given the group G, the plane II may be reconstructed. In principle, any axiomatic description of II yields a characterization of the projective group G. Of course, these characterizations may appear somewhat artificial from a group theoretical point of view, and other characterizations which are more closely related to group theoretical principles may be sought. This paper concerns the case of finite planes II. The question then is of interest in connection with the problem of characterizing the simple or nearly simple finite groups. If II belongs to the Galois field GS (q) with q elements, G is the group G..PGL (q). The final aim is that of giving a characterization of G by means of properties of the centralizer of an involution. This introductory paper deals with a set of postulates for a group G which permit a projective plane II in terms of G, such that G has a natural representation by collineations of II. These results are still close to a direct translation of projective geometry into group theory. A later paper will examine the characterizations of G by means of centralizers of involutions. The number q is odd. (Author)

AD-640 780 **Field 12A**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass.
SOME APPLICATIONS OF THE THEORY OF BLOCKS OF CHARACTERS OF FINITE GROUPS III,
by Richard Brauer. 1 Mar 65, 32p
Contracts AF 49 (638)-287, AF 49 (638)-1381
Proj. AF-9749
Task 974902
AFOSR-66-1352
Availability: Published in Journal of Algebra v1 n2 p225-55 Mar 1966.

Descriptors: (*Groups (Mathematics), *Combinatorial analysis), Theory, Algebra, Prime numbers, Set theory, Transformations (Mathematics).

Identifiers: Blocks (Mathematics).

AD-640 781 **Field 12A**
Not available from CFSTI.
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
OPTIMAL CONTROL, INEQUALITY STATE CONSTRAINTS, AND THE GENERALIZED NEWTON-RAPHSON ALGORITHM.
Revised ed.,
by Robert McGill. 20 Apr 65, 10p RE-218J
Contract AF 49 (638)-1207
Proj. AF-9749
Task 974901
AFOSR-66-1192
Revision of manuscript submitted 4 Mar 1965.
Availability: Published in J. Siam Control (SA) v3 n2 p291-8 1965.

Descriptors: (*Numerical methods and procedures, *Inequalities), (*Optimization, *Control), Algorithms.

The generalized Newton-Raphson algorithm has been developed as a tool for efficiently extracting solutions to nonlinear problems of optimal control by means of the modern high speed digital computer. This paper presents the extension of the algorithm to the important class of problems characterized by inequality constraints on the state space. The efficacy of the procedure is demonstrated by a numerical example. The problem solved is nonlinear, but admits of a closed form solution. This makes possible a direct comparison between the solution obtained by the algorithm and the analytic solution. (Author)

AD-640 792 **Field 12A**
Not available from CFSTI.
Syracuse Univ., N. Y. Dept. of Mathematics.
MEROMORPHIC FUNCTIONS WITH VALUES THAT ARE BOTH DEFICIENT AND ASYMPTOTIC.
by Albert Edrei. 1962, 14p
Contract AF-49 (638)-571
Proj. AF-9749
Task 974901
AFOSR-66-0218
Availability: Published in Studies in Mathematical Analysis and Related Topics p93-103 1962.

Descriptors: (*Functions, Theory).

AD-640 843 **Field 12A**
Not available from CFSTI.
Princeton Univ., N. J.
EXTENSION OF FENCHEL'S DUALITY THEOREM FOR CONVEX FUNCTIONS,
by R. T. Rockafellar. 2 Sep 64, 12p
Grant AF-AFOSR-1165-66
Proj. AF-9749
Task 974901
AFOSR-66-1238
Availability: Published in Duke Mathematical Journal v33 n1 p81-9 Mar 1966.

Descriptors: (*Theorems, *Functions), Convex sets, Inequalities, Topology, Numerical analysis, Partial differential equations.

Identifiers: Duality.

An extension of Fenchel's Duality Theorem to spaces of arbitrary dimension with a modification to the hypothesis to the effect that one of the convex functions is continuous at some point where both functions are finite. Solutions are characterized, application made to sums of convex functions and Lagrange multipliers. (Author)

AD-640 866 **Field 12A, 9D**
CFTI Prices: HC$1.00 MF$0.50
Cruft Lab., Harvard Univ., Cambridge, Mass.
A GENERAL SAMPLING THEOREM.
Technical rept.,
by J. Budelis, and N. Abramson. Jun 66, 18p
Cruft-TR-505
Contract Nonr-1866 (16)
Proj. NR-372-012

Descriptors: (*Theorems, *Sampling), Integral transforms, Bandwidth, Frequency, Information theory.

The usual form of the sampling theorem states that a function a (t), whose Fourier Transform A (f) vanishes outside the interval (-w, w) may be reconstructed exactly from its values at equally spaced sampling points taken at the 'Nyquist Rate' of 2w points per second. It is also known that a (t) may be reconstructed from its sample values taken at half the Nyquist rate if in addition we use the same number of samples from certain functions derived from a (t) (e.g., its Hilbert Transform or its derivative). In this paper the authors derive necessary and sufficient conditions in order that a (t) may be reconstructed from sample values of rather general functions b sub 1 (t), b sub 2 (t). . . b sub n (t) where the values of each b sub i (t) are taken at 1/n times the Nyquist rate. In addition, the sampling functions necessary for reconstruction are exhibited directly as the solutions of a linear matrix equation. This result includes as special cases k-derivative sampling, irregular spacing sampling and Hilbert Transform sampling. (Author)

AD-640 868 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
EMPIRICAL NONLINEAR PREDICTION AND POLYSPECTRA.
Technical rept.,
by John W. Van Ness. 12 Sep 66, 19p TR-18
Grants DA-ARO (D)-31-124-G726, NSF-GP-4265
AROD-2025:18

Descriptors: (*Mathematical prediction, *Statistical processes).

The classical linear prediction problem has received much attention both theoretically and empirically in the past few decades and a great deal is known about it (though there remain important open questions). The nonlinear prediction problem is much more difficult and much less is known about it. The present paper discusses a means of obtaining certain two-sided nonlinear predictors of a stationary process (X (t,w)) given a jointly stationary process (Y (t,w)). (Author)

AD-640 905 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.50
California Univ., Berkeley. Dept. of Mathematics.
SEMINAR ON FIBER SPACES,
by Emery Thomas. 1966, 53p
Grant AF-AFOSR-336-63
Proj. AF-9749
Task 974902
AFOSR-66-2025
Lecture Notes in Mathematics: An Informal Series of Special Lectures, Seminars and Repts. on Mathematical Topics delivered in 1964 in Berkeley, Calif., and in 1965 in Zurich (Switzerland).

Descriptors: (*Symposia, *Algebraic topology), Mapping (Transformations), Groups (Mathematics), Invariance, Combinatorial analysis.

Identifiers: Lectures.

Contents: Introduction: Principal Fiber Spaces; The classical method of decomposing a fibration; Oriented sphere bundles; Killing homotopy groups; An illustration; and Computing Postnikov invariants.

AD-640 918 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Dept. of Statistics.
THE USE OF PRIOR DISTRIBUTIONS IN THE DESIGN OF EXPERIMENTS FOR PARAMETER ESTIMATION IN NONLINEAR SITUATIONS: MULTIRESPONSE CASE.
Technical rept.,
by Norman R. Draper, and William G. Hunter.
May 66, 14p TR-75
Contract Nonr-1202 (17), Grant NSF-GP-2755
Proj. NR-042-222

Descriptors: (*Experimental design, *Statistical distributions), Decision theory, Multivariate analysis, Model theory.

When prior information is available on the parameters of a nonlinear model, it should influence the choice of the appropriate experimental design. The authors investigate, for the multiresponse case, how prior information on the parameters in the form of a multivariate normal distribution can be used in selecting designs for parameter estimation. An example illustrates how the precision of the prior knowledge can affect the positioning of the design points. (Author)

AD-640 941 **Field 12A**
Not available from CFSTI.
California Univ., San Diego, La Jolla. Dept. of Mathematics.
DIE CAUCHY-WEIL'SCHE INTEGRALDARSTELLUNG FUR SCHNITTE IN HOHARENTEN ANALYTISCHEN GARBEN (Cauchy-Weil Formulas for Cuts in Coherent Analytic Sheaves).
Interim rept.,
by Helmut Rohrl. 1966, 17p
Grant AF-AFOSR-920-65
Proj. AF-9749
Task 974902
AFOSR-66-1431
Text in German.
Availability: Published in Wissenschaftliche Abhandlung v33 p325-38 1966.

Descriptors: (*Algebraic topology, theory), Complex variables.

Identifiers: Cauchy-Weil formula.

The paper gives integral representations of the Cauchy-Weil type for sections in analytically coherent sheaves M whenever the module of sections in M is projective and satisfies certain additional conditions. The projectivity assumption is discussed in both the one-dimensional and the higher-dimensional case. In the one-dimensional case one obtains, as a by-product, a global form of Carleson's corona theorem. In the higherdimensional case the required projectivity is established for M a locally free sheaf over any relatively compact subset of a Stein variety; a partial converse of this result is proved. (Author)

AD-640 951 **Field 12A, 6C**
CFSTI Prices: HC$3.00 MF$0.75
McGill Univ., Montreal (Quebec).
STOCHASTIC AND SAMPLING PROCESSES FOR THE LOGARITHMIC SERIES DISTRIBUTION.
Scientific interim rept. for Jul 65-Jan 66,
by Ganapati P. Patil, and Richard W. Shorrock.
Jul 66, 90p
Contracts AF 33 (657)-11559, AF 33 (615)-2763
Proj. AF 7071
ARL-66-0147
Prepared in cooperation with Pennsylvania State Univ., University Park.

Descriptors: (*Statistical distributions, *Stochastic processes), (*Sampling, Statistical distributions), Biology, Quebec.

Identifiers: Logarithmic series distribution.

In the present report several stochastic and sampling processes leading to the logarithmic series distribution and some related distributions were studied. An attempt was made to present a unified picture, using a single notation, of the various derivations and approaches that appear in the literature. These derivations and approaches are compared and some of the relationships among them are brought out. Though the work is mainly interpretative, there are a few results that seem to be new. (Author)

AD-640 954 **Field 12A**
Not available from CFSTI.
Texas Univ., Austin, Computation Center.
ON TRIANGULARIZATION OF COMPLEX MATRICES BY TWO-DIMENSIONAL UNITARY TRANSFORMATIONS,
by Carl-Erik Froberg. 1965, 6p
Grant DA-ARO (D)-31-124-G388
AROD-3772:25
Prepared in cooperation with Lund Univ. (Sweden).
Availability: Published in BIT v5 p230-4 1965.

Descriptors: (*Matrix algebra, *Transformations (Mathematics)), Theory.

A theoretical discussion is presented concerning convergence difficulties in applying Jacobi-like methods for triangularization of general complex matrices. (Author)

AD-640 983 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.50
McGill Univ., Montreal (Quebec).
IDENTIFIABILITY OF COUNTABLE MIXTURE OF DISCRETE DISTRIBUTION,
by Ganapati P. Patil, and Sheela Bildikar. Jul 66, 57p
Contracts AF 33 (657)-11559, AF 33 (615)-2763
Proj. AF-7071
ARL-66-0146
Prepared in cooperation with Pennsylvania State Univ., University Park.

Descriptors: (*Statistical distributions, *Probability), Matrix algebra, Binomials, Identification.

The subject of the mixtures of probability distributions has aroused a fresh interest in the fields of Probability and Statistics. The present report attempts to solve by using the methods of infinite matrices some of the problems of the identifiability of countable mixtures of discrete probability distributions. While most of the results discussed are believed to be new, a few of them can be shown to be immediate consequences of a powerful result due to Teicher obtained by using a different approach. (Author)

AD-641 008 **Field 12A, 9D**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
RANDOM SAMPLING OF RANDOM PROCESSES: OPTIMUM LINEAR INTERPOLATION,
by Oscar A. Z. Leneman. 1964, 15p JA-2577
Contract AF 19 (628)-5167, Grant NsG-2-59
ESD-TR-66-371
Availability: Published in Journal of the Franklin Institute v281 n4 p302-14 Apr 1966.

Descriptors: (*Monte Carlo method, *Stochastic processes), Information theory, Approximation (Mathematics), Optimization.

The problem of optimum mean-square linear interpolation for random sampling is discussed in this

paper. The technique of study is very simple and further extends the work done in periodic sampling and in periodic sampling with jitter. For example, two sampling schemes are considered: nearly periodic sampling with skips and Poisson sampling. There is no restriction on the bandwidth of the signal; and, sampling errors in amplitude are also considered. Some of the results obtained are remarkably simple. (Author)

AD-641 018 **Field 12A, 6C**
CFSTI Prices: HC$2.00 MF$0.50
McGill Univ., Montreal (Quebec).
CERTAIN STUDIES ON THE MULTIVARIATE LOGARITHMIC SERIES DISTRIBUTION.
Interim rept., Jul 65-Jan 66,
by Ganapati P. Patil, and Sheela Bildikar. Jul 66, 49p
Contracts AF 33 (657)-11559, AF 33 (615)-2763
Proj. AF-7071
ARL-66-0148
Prepared in cooperation with Pennsylvania State Univ.

Descriptors: (*Statistical distributions, *Multivariate analysis), Ecology, Quebec.

Identifiers: Logarithmic series distribution.

The following aspects of the multivariate logarithmic series distribution are studied: The distributions related to the multivariate logarithmic series distribution including its marginal and conditional distributions, moment properties and the moments problem, some regression and correlation analysis, location of the mode, estimation of parameters by the methods of maximum likelihood and unbiased minimum variance. At the end, an application of the multivariate logarithmic series distribution in the field of population and community ecology is discussed. (Author)

AD-641 022 **Field 12A**
Not available from CFSTI.
Pisa Univ. (Italy).
EQUAZIONI PARABOLICHE DEL SECONDO ORDINE E SPAZI (L exp. 2, THETA) (OMEGA, DELTA) (Second Order Parabolic Equations and (L exp. 2, Theta) (Omega, Delta) Spaces).
Interim rept.,
by Sergio Campanato. 1966, 54p
Grant AF-EOAR-42-65
Proj. AF-9749
Task 974902
AFOSR-66-1982
Text in Italian, summary in English.
Availability: Published in Annali de Matematica Pura ed Applicata v73 ser4 p55-102 1966.

Descriptors: (*Boundary value problems, *Partial differential equations), (*Functional analysis, Partial differential equations), Italy.

AD-641 040 **Field 12A**
Not available from CFSTI.
Hamline Univ., St. Paul, Minn.
ON DIFFERENTIABLE TRANSFORMATIONS IN R (n),
by Dale E. Varberg. 19 Jul 66, 7p
Grant AF-AFOSR-35-65
Proj. AF-9749
Task 974902
AFOSR-66-1429
Avalability: Published in American Mathematical Monthly v73 n4 Pt2 p111-4 Apr 1966.

Descriptors: (*Mapping (Transformations), *Measure theory), Real variables, Set theory, Topology.

The paper gives a proof and notes some consequences of the following theorem. Let f be a mapping of an open subset D of R (n) into R (n). Let E be any measurable subset of D where f is differentiable and let J (x) denote the Jacobian determinant of f at x. Then the set f (E) is measurable and mf (E) < integral E J (x) dx, where m denotes n-dimensional Lebesgue measure. (Author)

AD-641 041 **Field 12A**
Not available from CFSTI.
Hamline Univ., St. Paul, Minn.
LINEAR TRANSFORMATIONS OF GAUSSIAN MEASURES,
by Dale E. Varberg. 17 May 65, 18p
Grant AF-AFOSR-35-65
Proj. AF-9749
Task 974902
AFOSR-66-1430
Availability: Published in Transactions of the American Mathematical Society v122 n1 p98-111 Mar 1966.

Descriptors: (*Measure theory, *Functional analysis), (*Transformations (Mathematics), Measure theory), Probability, Statistical processes.

The knowledge of measures in function spaces is poor, even in the simplest case of Gaussian measures. In a recent and excellent survey article A. M. Yaglom attributes this state of affairs to a lack of concrete theorems about the integral calculus of function spaces. Of all measures in function spaces, most is known about Wiener measure, especially as a result of a long series of papers by R. H. Cameron and W. T. Martin on the Wiener integral. One result, the linear transformation theorem, has recently been generalized although interims of Wiener measure by one of Cameron's students, D. A. Woodward. The purpose of the present paper is to state and prove an analog of Woodward's theorem for general Gaussian measures. These results are technically related to the elegant and highly abstract work of I. E. Segal, but it appears that they cannot be easily deduced from it. (Author)

AD-641 071 **Field 12A, 20J**
Not available from CFSTI.
Minnesota Univ., Minneapolis. Dept. of Mathematics.
GAUSSIAN PROCESSES AND GENERALIZED SCHROEDINGER EQUATIONS.
Doctoral thesis,
by John A. Beekman. 1965, 21p
Grant AF-AFOSR-381-65
Proj. AF-9749
Task 974902
AFOSR-66-1193
Availability: Published in Journal of Mathematics and Mechanics v14 n5 p789-806 Sep 1965.

Descriptors: (*Statistical processes, *Partial differential equations), Quantum mechanics, Boundary value problems, Complex numbers, Integrals.

Identifiers: Schroedinger equation.

In 'a family of integrals serving to connect the Wiener and Feynman integrals', Journal of Math and Physics, 39 (1960) 126-140, and 'The Ilstow and Feynman integrals', Journal D'Analyse Mathematique, 10, 1962-63, 287-361, R H Cameron has defined several special integrals connected with the Wiener integral, and has studied the existence and properties of those integrals. Under certain hypotheses on the integrand, these integrals are connected with R P Feynman's function space integral in the one dimensional case. These 'Feynman' integrals of certain classes of cuntionals serve as solutions to the Schroedinger equation. The present paper extends these ideas from the Wiener stochastic process to Gaussian Markov stochastic processes. Another problem considered is an existence theorem for a partial differential equation which plays the role for Gaussian Markov processes that the generalized heat flow equation does for the Wiener process. (Author)

AD-641 072 **Field 12A**
Not available from CFSTI.
British Columbia Univ., Vancouver. Dept. of Mathematics.
ON THE CONTINUOUS SPECTRUM OF A DIFFERENTIAL OPERATOR,
by Colin Clark. 28 Jul 65, 8p
Grant AF-AFOSR-379-65
Proj. AF-9749
Task 974901
AFOSR-66-1837
Availability: Published in Archive for Rational Mechanics and Analysis v21 n2 p163-8 1966.

Descriptors: (*Operators (Mathematics), Theory), Inequalities, Potential theory, Boundary value problems, Measure theory.

Identifiers: Spectral theory.

The author considers the Schrodinger differential operator l (u) = -delta u + q (x)u, for x E G, an unbounded region in Euclidean n-space. He introduces a function p (x), x E G, a type of cross-sectional diameter of G at x. An inequality of Poincare type is obtained. From this he derives a sufficient condition for semiboundedness of the minimal operator associated with l (u), and also obtains an estimate for the least point of the essential (or continuous) spectrum associated with l (u). As special cases he obtains known results of K. Friedrichs, R. Courant, F. Rellich, and F. H. Brownell. (Author)

AD-641 073 **Field 12A**
Not available from CFSTI.
California Univ., Santa Barbara. Dept. of Mathematics.
THE CAUCHY-SCHWARZ INEQUALITY IN THE EXTERIOR ALGEBRA,
by Marvin Marcus. 26 Apr 65, 6p
AF-AFOSR-698-65
Proj. AF-9749
Task 974901
AFOSR-66-1384
Availability: Published in The Quarterly Journal of Mathematics v17 n65 p61-3 1966.

Descriptors: (*Inequalities, *Matrix algebra), Theory.

Identifiers: Cauchy-Schwarz inequality.

The paper shows that the classical inequality due to E. Fischer for positive-definite hermitian matrices is in fact a special case of the Cauchy-Schwarz inequality in the appropriate exterior algebra. (Author)

AD-641 074 **Field 12A**
Not available from CFSTI.
California Univ., Santa Barbara. Dept. of Mathematics.
HARNACK'S AND WEYL'S INEQUALITIES,
by Marvin Marcus. 9 Jul 64, 7p
Grant AF-AFOSR-698-65
Proj. AF-9749
Task 974901
AFOSR-66-0665
Availability: Published in Proceedings of the American Mathematical Society v16 n5 p864-6 Oct 1965.

Descriptors: (*Inequalities, *Matrix algebra), Stochastic processes, Determinants, Convex sets, Functions.

Identifiers: Harnack's-Weyl's inequalities.

The paper is concerned with extending the classical Harnack inequality by making it depend on the inequalities of Weyl, relating the singular values and the eigenvalues. The techniques for proving this result are fairly standard and depend on maintaining convex functions on the polyhedron of doubly stochastic matrices. (Author)

AD-641 075 **Field 12A**
Not available from CFSTI.
California Univ., Santa Barbara. Dept. of Mathematics.
SIMPLE n-ASSOCIATIVE RINGS.
Interim rept.,
by D. L. Outcalt. 19 Nov 64, 12p

Grant AF-AFOSR-698-65
Proj. AF-9749
Task 974901
AFOSR-66-1490
Availability: Published in Pacific Journal of Mathematics v 17 n2 p304-9 1966.

Descriptors: (*Rings (Mathematics), Theory), Algebra.

The paper is concerned with certain classes of nonassociative rings. These rings are defined by first extending the associator (a, c)=(ab) c-a(bc). A ring is defined to be n-associative if the n-associator vanishes in the ring. It is shown that simple 4-associative and simple 5-associative rings are associative; simple 2k-associative rings are (2k - 1) associative or have zero center; and simple, commutative n-associative rings, 6 n 9, are associative. The concept of rings which are associative of degree 2k + 1 is defined, and it is shown that simple, commutative rings which are associative of degree 2k + 1 are associative. The characteristic of the ring is slightly restricted in all but one of these results.

AD-641 077 **Field 12A**
Not available from CFSTI.
California Univ., Santa Barbara. Dept. of Mathematics.
INTEGRAL SOLUTIONS TO THE INCIDENCE EQUATION FOR FINITE PROJECTIVE PLANE CASES OF ORDERS n CONGRUENT TO 2 (mod 4).
Revised ed.,
by E. C. Johnson. 18 May 65, 27p
Grant AF-AFOSR-698-65
Proj. AF-9749
Task 974901
AFOSR-66-1371
Revision of manuscript submitted 22 Dec 64. Prepared in cooperation with Ohio State Univ., Columbus.
Availability: Published in Pacific Journal of Mathematics v17 n1 p97-120 1966.

Descriptors: (*Projective geometry, *Matrix algebra), Combinatorial analysis.

A finite projective plane of order n or = 2 can be considered as a (v, k, lambda) design where v = n2 + n + 1, k=n + 1, and lambda= 1. As such, it can be characterized by its point-line 0, 1 incidence matrix A of order v satisfying the incidence equation (*) AA (T)=nI + J, where J is the matrix of order v consisting entirely of 1's. Thus, if a plane of order n exists then (*) has an integral solution A. Ryser has shown that if A is a normal integral solution to (*) or if A is merely an integral solution to (*) where n is odd, then A can be made into an incidence matrix for a plane of order n by suitably multiplying its columns by - 1. Such an integral solution to (*) we shall call a type I solution. When A is merely an integral solution to (*) where n is even, then A may be a type I solution but may also be not of this type. These latter integral solutions to (*) are called type II solutions. Ryser has constructed type II solutions for n = 2 and for all n congruent 0 (mod 4) for which there exists a Hadamard matrix of order n, and Hall and Ryser have constructed a type II solution for n = 10. In this paper the author constructs type II solutions for some infinite classes of values of n = 2 (mod 4). Basic to these constructions is a special class of (v, k, lambda) designs called skew-Hadamard designs whose incidence matrices form a part of the substructure of our type II solutions. He exhibits examples for n = 26 and 50 and also derive examples for n = 10 and 18. (Author)

AD-641 081 **Field 12A**
CFSTI Prices: HC$5.00 MF$1.00
Illinois Univ., Urbana. Electrical Engineering Research Lab.
TABLE OF THE STIRLING NUMBERS OF THE SECOND KIND S (N,K) FOR N,K UP TO 100 AND FOR VALUES OF S (N,K) EQUAL OR SMALLER THAN 10 (exp 109)-1.
Technical rept.,
by Alex M. Andrew. Dec 65, 185p TR-6
Grant AF-AFOSR-7-64
Proj. AF-9769
Task 976904
AFOSR-66 2373

Descriptors: (*Polynomials, *Tables), Numbers, Distribution theory, Combinatorial analysis, Programming (Computers).

Identifiers: Stirling numbers.

A printout is given for a program for computing Stirling numbers of the second kind that uses the recursive formula S (n,k) = S (n-1, k-1) + k. S (N-1,k) for k>2, and S (n,k) = 1 for k = 1. Computed values are given for S (n,k) < 10 (exp 109) - 1, 1< k < n <100. In an introduction, the use of Stirling numbers in various combinatorial problems is discussed, together with an explanation of the use of the table of computed values. Application of the table is described to obtain the following sums for multi-valued logical systems: (a) the number of functions represented by a particular morphogram, and (b) the number of morphograms that may be constructed that admit k different values in an m-valued system; a 'morphogram' is defined as a particular distribution of possible value occupancies alpha, beta, gamma. (Author)

AD-641 091 **Field 12A, 9D**
CFSTI Prices: HC$3.00 MF$0.75
Information Research Associates, Inc., Lexington, Mass.
FUNDAMENTALS OF THE WIENER CANONICAL EXPANSION.
Technical rept.,
by Robert W. Stout. Jul 66, 68p TR-6, IRA-102:3
Contract AF 49 (638)-1631

Descriptors: (*Pattern recognition, *Brownian motion), (*Mapping (Transformations), *Stochastic processes), Nonlinear systems, Statistical mechanics, Information theory.

Recent research by Brick and Zames has applied Wiener Canonical Forms to non-linear problems of pattern recognition. This tutorial paper outlines the background material of that work. Brownian Motion is discussed in a limiting physical situation which leads naturally to the abstract Wiener Random Process. Wiener's mapping procedure is introduced to facilitate the construction of linear and non-linear functionals of the Wiener Process. A general class of non-linear systems, useful in pattern recognition applications, is then characterized in terms of these functionals. (Author)

AD-641 097 **Field 12A, 20L**
Not available from CFSTI.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
ON THE GINZBURG-LANDAU EQUATIONS,
by R. W. Carroll, and A. J. Glick. 6 Dec 63, 14p
Grants AF-AFOSR-735-65, NSF-GP-1448
Proj. AF-9761
Task 976101
AFOSR-66-1344
Supported in part by AFOSR Grant AF-AFOSR-62-46. Prepared in cooperation with Rutgers Univ., New Brunswick, N. J.
Availability: Published in Archive for Rational Mechanics and Analysis v16 n5 p373-84 1964.

Descriptors: (*Partial differential equations, Theorems), (*Superconductors, Magnetic fields), Mapping (Transformations).

Identifiers: Ginzburg-Landau equations.

Existence and uniqueness theorems for weak solutions of the nonlinear Ginzburg-Landau partial differential equations are proven. The results are based on a contraction mapping principle and require the parameter K in the equations and the strength of the external magnetic field to be small. (Author)

AD-641 104 **Field 12A**
Not available from CFSTI.
North Carolina Univ., Chapel Hill.
PATHS AND CHAINS OF RANDOM STRAIGHT-LINE SEGMENTS.
Revised ed.,
by N. L. Johnson. Dec 65, 17p
Grant AF-AFOSR-760-65
Proj. AF-9749
Task 974902
AFOSR-66-1382
Revision of manuscript submitted Apr 65.
Availability: Published in Technometrics v8 n2 p303-17 May 1966.

Descriptors: (*Stochastic processes, *Distribution theory).

Classical problems associated with paths composed of straight line segments with independent orientations, which have a continuous distribution, are discussed. Moment formulas are obtained for the distance between initial and terminal points, and a new approximation discussed. The Rayleigh approximation is used to derive approximations to other characteristics of the random path. (Author)

AD-641 130 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
UPPER AND LOWER PROBABILITY INFERENCES BASED ON A SAMPLE FROM A FINITE UNIVARIATE POPULATION.
Technical rept.,
by A. P. Dempster. 10 Oct 66, 43p TR-14
Contract Nonr-1866 (37)
Proj. NR-042-097

Descriptors: (*Decision theory, *Probability), Sampling, Population (Mathematics), Measure theory.

Detailed formulas are provided for upper and lower probability inferences, based on a sample from an unknown finite population with a discrete univariate characteristic, and directed towards parameters of the population or properties of a future sample. (Author)

AD-641 146 **Field 12A, 14D**
CFSTI Prices: HC$2.00 MF$0.50
Rocketdyne, Canoga Park, Calif.
CONSISTENCY OF MAXIMUM LIKELIHOOD ESTIMATORS IN SOME RELIABILITY GROWTH MODELS.
Scientific rept.,
by Bernard Sherman. May 66, 33p
Contract AF 33 (615)-2818
Proj. AF-7071
ARL-66-0084

Descriptors: (*Reliability, *Decision theory), Probability, Failure (Mechanics), Model theory, Taylor's series, Operations research.

Properties of maximum likelihood estimators of parameters in some sample reliability growth models are investigated. In one model the underlying process is a Markov chain and the estimator of the single unknown parameter is proved consistent. In another model it is shown that no estimators can be consistent. Related estimation problems in sequences of geometric distributions are discussed. (Author)

AD-641 149 **Field 12A**
Not available from CFSTI.
Pisa Univ. (Italy).
SULLE MAGGIORAZIONI IN Lp NELLA TEORIA DELL'EQUAZIONI ELLITTICHE (On the L (p) Estimates in the Theory of Elliptic Equations),
by Sergio Campanato, and Guido Stampacchia.
11 Oct 65, 9p
Grant AF-EOAR-42-65
Proj. AF-9749
Task 974902

AFOSR-66-0203
Text in Italian. Summary in English.
Availability: Published in Boll U. M. I. v20 n3 p393-99 1965.

Descriptors: (*Partial differential equations, Theory), Measure theory, Functional analysis, Italy.

L (p) estimates for derivatives of solutions of second order elliptic partial differential equations are proved making use of L (2), estimates given by Campanato and of an interpolation theorem given by Stampacchia. (Author)

AD-641 193 **Field 12A, 5A, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Western Management Science Inst., Univ. of California, Los Angeles.
ON COMPUTING THE EXPECTED DISCOUNTED RETURN IN A MARKOV CHAIN,
by David F. Hitchcock, and James B. MacQueen.
Aug 66, 15p WMSI Working Paper-105
Contract Nonr-233 (75)
Proj. NR-047-041

Descriptors: (*Probability, *Operations research), Inventory control, Dynamic programming, Replacement theory, Decision theory.

The discounted return associated with a finite state Markov chain X sub 1, X sub 2... is given by g (X sub 1) + alpha g (X sub 2) + alpha 2g (X sub 3) + ..., where g (x) represents the immediate return from state x. Knowing the transition matrix of the chain, it is desired to compute the expected discounted return (present worth) given the initial state. This type of problem arises in inventory theory, dynamic programming and elsewhere. Usually the solution is approximated by solving the system of linear equations characterizing the expected return. These equations can be solved by a variety of well-known methods. This paper describes yet another method, which is a slight modification of the classical iterative scheme. The method gives sequences of upper and lower bounds which converge monotonely to the solution. Hence, the method is relatively free of error control problems. Computational experiments were conducted which suggest that for problems with a large number of states, the method is quite efficient. The amount of computation required to obtain the solution increases much slower with an increase in the number of states, N, than with the conventional methods. In fact, computational time is more nearly proportional to N2, than to N3. (Author)

AD-641 195 **Field 12A, 5A, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Western Management Science Inst., Univ. of California, Los Angeles.
TWO SHORT NOTES ON MARKOV PROCESSES: I. A TEST FOR SUB-OPTIMAL ACTIONS IN MARKOVIAN DECISION PROBLEMS. II. AN INTRINSICALLY DETERMINED MARKOV CHAIN,
by James B. MacQueen. Aug 66, 13p WMSI Working Paper-107
Contract Nonr-233 (75)
Proj. NR-047-041

Descriptors: (*Statistical processes, *Decision theory), Dynamic programming, Inventory control, Replacement theory, Probability.

In a Markovian decision problem choice of an action determines an immediate return and the probability of moving to the next state. It is desired to maximize the expected total of discounted future returns. If upper and lower bounds on the optimal expected return are available, a simple test is described which may show that certain actions are sub-optimal, permanently eliminating them from further consideration. This test may be incorporated into the dynamic programming routine for solving the decision problem. This was tried on Howard's automobile replacement problem, using the upper and lower bounds described in 'A Modified dynamic programming method' (J. of Math. Anal. and Appl., 14 April, 1966). The amount of computation required by the dynamic programming routine was reduced, conservatively, by 75%. (Note I) This paper describes a situation where there is a transient Markov chain with one absorbing state, such that the transition law of the process itself depends on the probability of the process being trapped in the absorbing state. Thus the process is defined implicitly, by its own behavior, so to speak. The existence and uniqueness of a transition law satisfying the given conditions is established. This result may give rise to additional ways of characterizing optimal policies, as is suggested by interpreting the result in terms of the behavior of a gambler. (Note II)

AD-641 228 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Research Triangle Inst., Durham, N. C.
CENTRAL LIMIT THEOREMS FOR WEAKLY STATIONARY SEQUENCES.
Technical rept.,
by R. J. Serfling. Sep 66, 22p TR-1
Contract DA-31-124-ARO (D)-323
Proj. DA-20014501B14C
AROD-5506:1

Descriptors: (*Theorems, *Stochastic processes), Sequences, Measure theory.

Identifiers: Central limit theorem.

Analysis of stochastic processes often involves weakly stationary sequences of random variables. The usefulness of central limit theory in inference based upon large samples of independent variables encourages efforts to carry it over to such sequences of dependent variables. The specialization of a theorem of Hoeffding and Robbins to weakly stationary and m-dependent sequences is generalized herein to a wide class of weakly stationary sequences. Various ways of restricting dependence are discussed. Stringent conditions such as strict stationarity and strong mixing are not assumed, so wide applicability is possible. (Author)

AD-641 229 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Research Triangle Inst., Durham, N. C.
LARGE SAMPLE TESTS FOR SPECTRAL DENSITIES.
Technical rept.,
by Jonathan D. Cryer. Sep 66, 9p TR-2
Contract DA-31-124-ARO (D)-323
Proj. DA-20014501B14C
AROD-5506:2

Descriptors: (*Statistical tests, *Stochastic processes), Statistical functions, Sampling.

Identifiers: Spectral theory.

A family of statistics is proposed for the problem of testing the hypothesis that the sample X sub t, 0 l t l T, is from a stationary stochastic process with a given covariance function or spectral density. (Author)

AD-641 279 **Field 12A**
CFSTI Prices: HC$7.60 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
PROCEDURES FOR OBTAINING BINOMIAL PROBABILITIES WITHIN THREE DECIMAL ACCURACY UNIVERSALLY,
by Ed S. Smith. May 50, 74p BRL-718

Descriptors: (*Probability, *Binomials), Tables, Graphics, Numerical methods and procedures.

This self-contained report includes methods, graphs and tables by which binomial probabilities can be evaluated with errors that are always less than substantially 0.001. (Author)

NAA-SR-11913 **Field 12A, 18J, 18N**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
THE APPLICATION OF K-FACTORS FOR RELIABILITY EVALUATION OF TEST PROGRAMS,
by R. H. Anderson. 15 Jul 66, 16p
Contract AT (11-1)-GEN-8

Descriptors: (*Reactor fuel elements, Reliability), (*Space flight, Reactor fuel elements).

For abstract, see NSA 20 21.

N66-30259 **Field 12A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LINEAR PREDICTION ON A FINITE PAST OF A MULTIVARIATE STATIONARY PROCESS.
by R. G. Langebartel. Jul 66, 34p NASA-TR-R-244

Descriptors: *Linear prediction, *Stochastic process, *Time series, Control, Error, Finite, Linear, Mean, Past, Prediction, Process, Random, Series, Square, Stationary, Stochastic, Theory, Time.

For abstract, see STAR 04 17.

N66-31207 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPUTER GENERATION OF QUADRATURE COEFFICIENTS UTILIZING THE SYMBOLIC MANIPULATION LANGUAGE FORMAC.
by P. Swigert. Aug 66, 21p NASA-TN-D-3472

Descriptors: *Compiler program, *Computer program, *Quadrature, Chart, Coefficient, Collocation, Compiler, Computer, Flow, Fraction, Function, High speed, Integration, Language, Manipulation, Numerical, Point, Program, Rational, Symbol, Weight.

For abstract, see STAR 04 17.

N66-31347 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Washington, D. C.
THE HUREWICZ THEOREM.
O Teoreme Gurevicha
by A. V. Zarelua. Jul 66, 20p NASA-TT-F-421 Transl. Into English From Mat. Sb. (Moscow) V. 60, No. 1, 1963 P 17-28

Descriptors: *Geometry, *Theorem proving, *Topology, Completeness, Decomposition, Lemma, Proving, Space, Theorem, Weak.

For abstract, see STAR 04 17.

N66-31372 **Field 12A**
CFSTI Prices HC$2.00 MF$0.50
Maryland Univ., College Park. Computer Science Center.
ON A CLASS OF APPROXIMATE ITERATIVE PROCESSES.
by J. M. Ortega, and W. C. Rheinboldt. Jun 66. 37p NASA-CR-76394, TR-66-31
Grant NSG-398

Descriptors: *Fixed point, *Topology, Analysis, Differential, Equation, Fixed, Functional, Iterative solution, Linear, int, Space.

For abstract, see STAR 04 17.

N66-31767 **Field 12A**
CFSTI Prices HC$2.00 MF$0.50
Stevens Inst. Of Tech., Hoboken, N. J.
APPLICATION OF FORMAL POWER SERIES TO SOME CLASSICAL PROBLEMS OF MECHANICS FINAL REPORT.
by L. Goldman. 1966, 28p NASA-CR-76433
Grant NSG-403

Descriptors: *Celestial mechanics, *Power series, *Three-body problem, Algebra, Application, Body, Celestial, Coordinate, Differential, Equation, Freedom, Function, Isomorphous, Manifold, Many-body, Mechanical, Power, Problem, Series, System, Theorem, Three.

For abstract, see STAR 04 17.

N66-31768 Field 12A
CFSTI Prices HC$2.00 MF$0.50
Bellcomm, Inc., Washington, D. C.
THE ANALYSIS OF A COUNTDOWN AS A STOCHASTIC SEQUENTIAL PROCESS WITH RECYCLE POLICIES.
by J. S. Engel. 16 Aug 65, 37p NASA-CR-76438, TM-65-1031-2
Contract NASW-417

Descriptors: *Countdown, *Probability density, *Random variable, *Stochastic process, Density, Duration, Failure, Function, Model, Probability, Process, Random, Recycle, Stochastic, Time, Variable.

For abstract, see STAR 04 17.

N66-31949 Field 12A
CFSTI Prices HC$2.00 MF$0.50
Institute Of Technology, Helsinki (Finland).
ON THE INTEGRAL TRANSFORMATION OF THE LINEARIZED PERTURBATION VELOCITY POTENTIAL.
by M. A. Ranta. 1965, 26p ME-22

Descriptors: *Differential equation, *Integral operator, *Perturbation theory, *Velocity potential, Boundary, Differential, Discontinuity, Equation, Integral, Kernel, Operator, Perturbation, Potential, Theory, Value, Velocity.

For abstract, see STAR 04 17.

N66-32108 Field 12A
CFSTI Prices HC$4.00 MF$0.75
Honeywell, Inc., St. Paul, Minn.
MINIMAX STUDIES.
by W. A. Glasser, K. D. Graham, and C. A. Harvey. Aug 66, 107p NASA-CR-547
Contract NAS8-11206

Descriptors: *Control system, *Harmonic oscillator, *Linear system, *Missile control, Algorithm, Amplitude, Bound, Condition, Control, Controller, Effect, Extreme, Harmonic, Initial, Input, Launch vehicle, Linear, Minimum, Missile, Nonzero, Oscillator, Rate, Selection, System, Wind.

For abstract, see STAR 04 17.

N66-32139 Field 12A
CFSTI Prices HC$1.00 MF$0.50
Alabama Univ., University.
TOPOLOGICAL DYNAMICS QUARTERLY PROGRESS REPORT, JAN. - MAR. 1966.
1966, 6p NASA-CR-76564
Contract NAS8-1646

Descriptors: *Dynamics, *Geoid, *Oblateness, *Topology, Analysis, Body, Dimension, Geometry, Legendre, polynomial, Lunar, Mathieu function, Model, Motion, Newton theory, One, System, Theory.

For abstract, see STAR 04 17.

N66-32261 Field 12A
CFSTI Prices HC$1.00 MF$0.50
Kent State Univ., Ohio. Dept. Of Mathematics.
SAMPLE QUADRATIC VARIATION OF SAMPLE CONTINUOUS SECOND ORDER MARTINGALES TECHNICAL REPORT NO. 12.
by D. L. Fisk. Jul 66, 20p NASA-CR-76705
Grant NSG-568
Submitted For Publication

Descriptors: *Quadratic equation, *Statistical probability, *Stochastic process, Continuous, Equation, Order, Probability, Process, Quadratic, Sample, Second, Statistical, Stochastic, Variation.

For abstract, see STAR 04 17.

N66-32295 Field 12A
CFSTI Prices HC$2.00 MF$0.50
Brown Univ., Providence, R. I.
PERIODIC SOLUTIONS OF A CLASS OF HYPERBOLIC EQUATIONS CONTAINING A SMALL PARAMETER.
by J. K. Hale. 1966, 46p NASA-CR-76728
Contracts NGR-40-002-015, NSF GP-4362

Descriptors: *Hyperbolic equation, *Wave equation, Bifurcation, Equation, Function, Homogeneity, Hyperbola, Linear, Mathematics, Nonlinear, Periodic, Problem, Solution, Wave.

For abstract, see STAR 04 17.

N66-32332 Field 12A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
INVERSE OF THE VANDERMONDE MATRIX WITH APPLICATIONS.
by L. R. Turner. Aug 66, 16p NASA-TN-D-3547
Contract 129-04-06-02-22

Descriptors: *Matrix algebra, *Polynomial, Algebra, Application, Approximation, Factor, Formula, Function, Generation, Inverse, Linear, Matrix, Property, Transform.

For abstract, see STAR 04 17.

N66-32562 Field 12A
CFSTI Prices HC$3.00 MF$0.75
France. Ministere De L Air, Paris.
GENERAL PARAMETERIZATION OF A LINEAR PROGRAM.
Parametrisation Generale D'un Programme Lineaire
by H. Maurin. 1966, 104p NT-149
1966 104 P Refs In French

Descriptors: *Carbon, *Computer program, *Nonlinear programming, *Petroleum, Bound, Computer, Linear, Linear programming, Matrix, Nonlinear, Optimal, Parameter, Preparation, Programming, Refining, Single, Solution, Variable, Vector, Volatile.

For abstract, see STAR 04 17.

N66-32633 Field 12A
CFSTI Prices HC$2.00 MF$0.50
Wisconsin Univ., Madison. Mathematics Research Center.
OPTIMAL CONTROL AND CONVEX PROGRAMMING.
by J. B. Rosen. Feb 65, 8p NASA-CR-76959, MRC-547
Grant NSG-565, Contract DA-11-022-ORD-2059

Descriptors: *Optimal control, *Programming, Control, Differential, Dynamic, Equation, Linear, Optimal, System, Theory.

For abstract, see STAR 04 17.

N66-36846 Field 12A
CFSTI Prices HC$3.00 MF$0.75
International Business Machines Corp., Gaithersburg, Md.
A GENERAL METHOD FOR THE COMPUTATION OF CARTESIAN COORDINATES AND PARTIAL DERIVATIVES OF THE TWO-BODY PROBLEM.
by W. H. Goodyear. Sep 66, 103p NASA-CR-522
Contract NAS5-9762

Descriptors: *Cartesian coordinate, *Fortran, *Two-body problem, Acceleration, Computer, Coordinate, Derivative, Equation, Ibm 7094 computer, Kepler law, Mathematics, Motion, Partial, Program, Subroutine.

For abstract, see STAR 04 22.

N66-37212 Field 12A
CFSTI Prices HC$1.00 MF$0.50
Rand Corp., Santa Monica, Calif.
STATISTICAL ESTIMATION PROCEDURES FOR THE "BURN-IN" PROCESS.
by R. E. Barlow, A. Madansky, F. Proschan, and E. M. Scheuer. Sep 66, 21p NASA-CR-78131, RM-5109-NASA
Contract NASR-21

Descriptors: *Quality control, *Statistical analysis, Analysis, Control, Estimation, Failure, Function, Identification, Mode, Quality, Rate, Reliability, Statistical.

For abstract, see STAR 04 22.

N66-37413 Field 12A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A MILLISECOND CONVERSION TABLE.
by D. E. Jamison. Sep 66, 17p NASA-TM-X-55563, X-564-66-426

Descriptors: *Conversion table, *Time scale, Conversion, Day, Greenwich mean time, Hour, Scale, Second, Table, Time, Unit.

For abstract, see STAR 04 22.

N66-37416 Field 12A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Electronics Research Center, Cambridge, Mass.
DIFFERENTIAL GAMES AND MANUAL CONTROL.
by S. Baron. Oct 66, 18p NASA-TN-D-3659
Contract 125-19-01-01-25

Descriptors: *Game theory, *Problem solving, *Variation method, Computer, Control, Differential, Game, Manual, Mathematics, Method, Pilot, Problem, Pursuit, Simulation, Solution, Strategy, Theory, Variaion.

For abstract, see STAR 04 22.

N66-37467 Field 12A
CFSTI Prices HC$1.00 MF$0.50
Institut D Aeronomie Spatiale De Belgique, Brussels.
AN ITERATIVE METHOD FOR THE SOLUTION OF EIGENVALUE PROBLEMS.
by M. Godart. 1965, 18p A-38-1965
Submitted For Publication

Descriptors: *Eigenvalue, *Iterative solution, *Problem solving, Algorithm, Approximation, Boundary, Convergence, Differential, Diffusion, Eigenfunction, Equation, Ibm 7040 computer, Iteration, Mathematics, Method, Principle, Problem, Rayleigh-ritz method, Solution, Sturm-liouville equation, Value, Variation.

For abstract, see STAR 04 22.

PB-173 184 Field 12A
CFSTI Prices: HC$7.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.

CONTRIBUTION A L'ETUDE DES LIAISONS LIMITES ENTRE DIFFERENTES STATISTIQUES D'UN ECHANTILLON (Contribution to the Study of the Dependence in the Limit Between Various Statistics of a Sample).
Doctoral thesis in French,
by Alex Rosengard. 11 Feb 66, 80p CEA-R-2944
Text in French; Attached Summary in English.

Descriptors: (*Statistical analysis, *Sampling), Statistical distributions, Correlation techniques, Analysis of variance, Probability, France.

With a view to the investigation of the dependence in the limit between some statistics, general definitions are given of the independence in the limit and some of their properties are investigated. Some necessary and sufficient conditions are then given for the independence in the limit between sample mean and orders statistics, in particular quantiles and extreme values. For example, it is shown that, for bounded variance laws, the sample mean and orders statistics, in particular quantiles and extreme values. For example, it is shown that, for bounded variance laws, the sample mean tends to become independent of the extreme values, whereas it is asymptocally dependent on the quantiles, with a positive correlation coefficient for which an expression is given. The case is also investigated in which variance is unbounded. (Author)

AD-640 542 See Field 9E

AD-640 599 See Field 9B

AD-640 613 See Field 13H

AD-640 621 See Field 19E

AD-640 758 See Field 9B

AD-640 839 See Field 20K

AD-640 924 See Field 9E

AD-641 011 See Field 19D

AD-641 128 See Field 3C

AD-641 155 See Field 20M

AD-641 281 See Field 20H

PB-170 823 See Field 5I

12B. OPERATIONS RESEARCH

AD-640 668 **Field 12B, 5A**
CFSTI Prices: HC$2.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
OPTIMAL TRANSPORTATION BASES.
Management sciences research rept.,
by Wieslaw Grabowski, and Wlodzimierz Szwarc.
Jul 66, 50p MSRR-80
Contract Nonr-760 (24)
Proj. NR-047-048
Prepared in cooperation with Central School of planning and Statistics, Warsaw (Poland) and Technical Univ., Wroclaw (Poland).

Descriptors: (*Optimization, *Transportation), (*Linear programming, Transportation), Sequences, Graphics, Matrix algebra, Perturbation theory, Costs.

The paper deals with transportation cost matrices which possess a certain specific property referred to as 'Property A.' Theorems are supplied which help to characterize such matrices. A method of solving the classical transportation problem is presented, as based on what are presently called 'optimal transportation bases.' In this method finiteness is guaranteed by using a special perturbation technique on the cost matrix which is to be transformed into some cost matrix of property A. Several properties of optimal bases of cost matrices possessing property A are also examined and theorems on the number of such bases are supplied. In the concluding section some comparisons between the OBM and the classical primal transportation method are made. (Author)

AD-640 685 **Field 12B, 5C, 5A**
Not available from CFSTI.
Michigan Univ., Ann Arbor. Dept. of Economics.
A NOTE ON TIME-COST TRADEOFFS IN UNCERTAIN EMPIRICAL RESEARCH PROJECTS,
by F. M. Scherer. Sep 66, 3p
Availability: Published in Naval Research Logistics Quarterly v13 n3 p349-50 Sep 1966.

Descriptors: (*Scientific research, *Time studies), Costs, Linear programming, Scheduling, Uncertainty.

This is a revision to the author's paper, 'Time-Cost Tradeoffs in Uncertain Empirical Research Projects,' which appeared in the March 1966 Naval Research Logistics Quarterly. It pertains to an integer programming formulation of the time-cost tradeoff function definition problem when both costs of alternative technical approaches and success probabilities vary from approach to approach. The problem is to decide which of N research approaches to schedule in each of T time periods so as to minimize the expected value of costs E (C) for various values of T.

AD-640 697 **Field 12B, 5A, 15E**
Not available from CFSTI.
Service Bureau Corp., New York. Operations Research Dept.
VESSEL ALLOCATION BY LINEAR PROGRAMMING,
by J. Laderman, L. Gleiberman, and J. F. Egan.
Sep 66, 6p
Availability: Published in Naval Research Logistics Quarterly v13 n3 p315-20 Sep 66.

Descriptors: (*Linear programming, Scheduling), (*Cargo ships, *Scheduling), Transportation, Management planning.

The paper presents a linear progamming model of a fleet of vessels which is required to transport quantities of cargo, such as coal, iron ore, limestone, and salt from certain producing ports to specific destination ports. This model has been implemented and is currently being used both for planning purposes and as an aid in scheduling the trips to be made by each vessel. (Author)

AD-640 730 **Field 12B**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A COMPUTING METHOD FOR THE LINEAR TIME OPTIMAL CONTROL SYSTEM,
by Tai Ju Wei, Li Pow So, and Wang Yu Yin. 12 Jul 66, 26p FTD-TT-65-1921
TT-66-62501
Edited trans. of Tzu Tung Hua Hsueh Pao (Chinese People's Republic) v2 n3 p123-35 1964.

Descriptors: (*Approximation (Mathematics), *Control systems), Linear systems, Optimization, Time, China.

Identifiers: Invariant imbedding principle.

On the basis of the 'Principle of Invariant Imbedding,' a successive approximation method is proposed to solve the linear time optimal controls subject to various constraints. Formulas for estimating the transient time are also given. An example for the nontrivial case is given. (Author)

AD-640 732 **Field 12B**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
DYNAMIC PROGRAMMING AND THE HAMILTON-JACOBI METHOD OF CLASSICAL MECHANICS,
by S. E. Dreyfus. Oct 66, 33p RM-5116-PR
Contract AF 49 (638)-1700

Descriptors: (*Dynamic programming, *Optimization), (*Calculus of variations, Dynamic programming), Simultaneous equations, Mechanics.

Identifiers: Hamilton-Jacobi theory.

A new dynamic programming derivation is presented for the classical Hamilton-Jacobi method of solving optimization problems. The connections with the usual dynamic programming approach are developed and illustrated. (Author)

AD-640 767 **Field 12B**
Not available from CFSTI.
Research Analysis Corp., McLean, Va.
STATISTICAL DECISION ANALYSIS OF STOCHASTIC LINEAR PROGRAMMING PROBLEMS,
by Jerome Bracken, and Richard M. Soland.
1965, 21p
Availability: Published in Naval Research Logistics Quarterly v13 n3 p205-24 Sep 1966.

Descriptors: (*Decision theory, *Linear programming), (*Stochastic processes, Linear programming), Integration, Monte Carlo method.

The paper presents a statistical decision analysis of a one-stage linear programming problem with deterministic constraints and stochastic criterion function. Procedures for obtaining numerical results are given which are applicable to any problem having this general form. The authors begin by stating the statistical decision problems to be considered, and then discuss the expected value of perfect information and the expected value of sample information. In obtaining these quantities, use is made of the distribution of the optimal value of the linear programming problem with stochastic criterion function, and so they discuss Monte Carlo and numerical integration procedures for estimating the mean of this distribution. The case in which the random criterion vector has a multivariate Normal distribution is discussed separately, and more detailed methods are offered. Dual problems are discussed including some relationships of this work with other work in probabilistic linear programming. An example is given showing application of the methods to a sample problem. The accuracy of a procedure for approximating the expected value of information is considered. (Author)

AD-640 768 **Field 12B, 15E**
Not available from CFSTI.
Michigan Univ., Ann Arbor.
USE OF COMPLETELY REDUCED MATRICES IN SOLVING TRANSPORTATION PROBLEMS WITH FIXED CHARGES,
by Paul S. Dwyer. 1966, 26p
Grant NSF-GP-4308
Availability: Published in Naval Research Logistics Quarterly v13 n3 p289-313 Sep 66.

Descriptors: (*Transportation, *Scheduling), (*Matrix algebra, Scheduling), Optimization.

The paper shows how completely reduced matrices can be used in obtaining exact or approximate solutions to transportation problems with fixed charges. It does not treat methods for obtaining reduced matrices, which are available elsewhere, but it does discuss the problem of obtaining a completely reduced matrix, and then a general parametric solution to the primal problem, from any particular solution. Methods for obtaining particular solutions with determinacies of maximum order (solutions for the constant fixed charges problem) are then presented. The paper terminates with a discussion of methods which are useful in obtaining approximations to solutions of fixed charge problems with charges not constant. (Author)

AD-640 788 **Field 12B**
Not available from CFSTI.
RIAS, Inc., Baltimore, Md.
ON THE EXISTENCE OF OPTIMAL STOCHASTIC CONTROLS.
Revised ed.,
by Harold J. Kushner. 9 Aug 65, 14p
Contracts AF 49 (638)-1206, NASw-845
Proj. AF 9749
Task 974901
AFOSR-66-0759
Revision of manuscript submitted 20 Jun 64.
Availability: Published in J. SIAM Control v3 n3 (SerA) p463-74 1966.

Descriptors: (*Optimization, *Control), (*Stochastic processes, Control), Theory, Differential equations, Vector analysis, Brownian motion.

It is proved under prescribed conditions that if there exists one stochastic control, then there is an optimum stochastic control. Two types of tasks or terminal conditions are investigated. The first is that a continuous function of the state vanishes at a random stopping time. The second is that a function of the expectation of the state vanishes at a non-random stopping time. The question of existence is equivalent to that of the closure of an appropriate set of attainable sample states or expectations. (Author)

AD-640 790 **Field 12B, 22B**
Not available from CFSTI.
Stanford Univ., Calif. Div. of Engineering Mechanics.
OPTIMUM AND QUASI-OPTIMUM CONTROL OF THIRD- AND FOURTH-ORDER SYSTEMS,
by I. Fluegge-Lotz, and H. A. Titus Jr. 1963, 11p
Contract AF 49 (638)-513
Proj. AF-9749
Task 974901
AFOSR-66-0039
Proceedings of the Congress of the International Federation of Automatic Control (2nd)Basle (Switzerland), 1963.
Availability: Published in Automatic and Remote Control p363-70 1963.

Descriptors: (*Optimization, *Control), Calculus of variations, Control systems, Spacecraft, Fuel consumption.

Based on experiences with second-order plants, a systematic attempt has been made to approximate the exact switching surfaces for third-order plants. There is an approximation of the surface portion close to the origin (the so-called 'inner' surface) and an approximation of the larger portion of the switching surface which is not close to the origin (the 'outer' surface). Examples show the use of these surfaces; their results are compared to results with exactly optimum switching. They agree well. The extension to fourth-order systems is indicated. (Author)

AD-640 869 **Field 12B, 15E**
CFSTI Prices: HC$2.00 MF$0.50
Decision Studies Group, Palo Alto, Calif.
SERVOMECHANISMS, EXPONENTIAL SMOOTHING, AND A MULTIECHELON INVENTORY PROBLEM,
by Stuart A. Bessler, and Peter W. Zehna. Sep 66, 42p
Contract Nonr-4457 (00)
Proj. NR-347-001

Descriptors: (*Inventory control, Optimization), Stock level control, Exponential functions, Numerical analysis, Servomechanisms.

A periodic review inventory system is viewed as a servomechanism in which input is demand and output is inventory level. An order rule embodying a forecast procedure is determined. When demand is random with constant mean and finite exponential smoothing is used in the forecast, the variance of the inventory on hand at the end of each period is derived. An unbiased modification of exponential smoothing (finite exponential smoothing) is introduced, and the order rule employing this procedure determined. The variation in inventory at the end of the period is obtained and compared with that obtained with exponential smoothing. Bounds and asymptotic expressions for the inventory variances are derived, and the performance of the two order rules is examined in a computer simulation. The servomechanism approach is employed to examine a multiechelon supply system. Order rules embodying forecast procedures are obtained for each facility. A system consisting of two facilities supplied by a depot facility is simulated and the effects of changing the information supplied to the depot is examined. (Author)

AD-640 926 **Field 12B, 9C**
Not available from CFSTI.
Illinois Univ., Urbana. Coordinated Science Lab.
ON INVARIANCE AND SENSITIVITY.
by J. B. Cruz Jr, and W. R. Perkins. 1966, 6p
Contract DA-28-043-AMC-00073 (E), Grant AF-AFOSR-931-65
Proj. AF-9749
Task 974901
AFOSR-66-1372
Availability: Published in IEEE International Convention Record pt7 p159-62 1966.

Descriptors: (*Invariance, Sensitivity), Linear systems, Input-output devices, Feedbacks, Functions.

A linear multivariable differential system subject to parameter variations as well as disturbance inputs is considered. The results of Rozonoer, Rutman and Epelman, and Wang on total invariance and unobservability are reviewed and unified. The conditions for parameter invariance specify the manner in which the parameters must change in order to maintain an invariant system behavior (such as input-output or state-output relationships). These conditions may be interpreted as defining a class of equivalent systems. From such an equivalence class, a system design may be chosen on the basis of sensitivity to parameter variations which does not satisfy the invariance conditions. Noting that the conditions for total invariance or zero sensitivity are too stringent for practical use, we obtain bounds for norms of sensitivity functions, and give interpretations of these bounds. (Author)

AD-641 024 **Field 12B, 13F**
CFSTI Prices: HC$5.60 MF$0.50
ARINC Research Corp., Washington, D. C.
A MODEL FOR SCHEDULING MAINTENANCE UTILIZING MEASURES OF EQUIPMENT PERFORMANCE,
by C. E. Bradley, and E. L. Welker. 1 Oct 59, 58p 101-21-150, Research Monograph-8
Contract NObsr-64508

Descriptors: (*Tires, Maintenance), (*Maintenance, *Scheduling), Performance (Engineering), Mathematical models, Operations research, Replacement theory, Costs.

The report describes a method for scheduling preventive maintenance to minimize expected average hourly maintenance cost based on a criterion of periodically observing deterioration in one or more equipment performance characteristics. The mathematical procedure requires expressing the deterioration phenomenon in the form of a simple Markov process. The implication of this method is that a forecast of equipment failure is based only on existing performance level and is independent of any history of prior deterioration rate. The criterion for scheduling preventive maintenance is expressed as a method involving matrix multiplication rather than as a simple algebraic formula or a series of curves. This was necessitated by the large number of input parameters consisting of maintenance cost parameters and a matrix of probabilities descriptive of the deterioration phenomenon. Hypothetical numerical examples established the potential of this method for achieving real saving in maintenance cost. The method provides a systematic search for 'lemon' equipments, and, conversely, protects against discarding those equipments which tend to maintain high performance levels over extended periods of time. As an added result of this analysis, the algebraic method provides a technique for collecting deterioration data in terms of distributions and not just averages. (Author)

AD-641 076 **Field 12B**
Not available from CFSTI.
Brown Univ., Providence, R. I. Center for Dynamical Systems.
ON THE STATUS OF OPTIMAL CONTROL AND STABILITY FOR STOCHASTIC SYSTEMS,
by Harold J. Kushner. 1966, 11p
Grants AF-AFOSR-693-65, NGR-40-002-015
Proj. AF-9749
Task 974901
AFOSR-66-1422
Availability: Published in IEEE International Convention Record pt6 p143-51 1966.

Descriptors: (*Control, *Optimization), Stability, Stochastic processes, Bibliographies.

The paper discusses the status of optimal control and reliability for stochastic systems. Linear diffusion models, non-linear diffusion models, a property of a non-linear diffusion equation, and a result in optimal stochastic control with examples are given. An elaborate bibliography of recent papers dealing with this area of research is also included. (Author)

AD-641 078 **Field 12B**
Not available from CFSTI.
Brown Univ., Providence, R. I. Center for Dynamical Systems.
ON THE CONSTRUCTION OF STOCHASTIC LIAPUNOV FUNCTIONS.
Revised ed.,
by H. J. Kishner. 9 Jun 65, 3p
Grant AF-AFOSR-693-65
Proj. AF-9749
Task 974901
AFOSR-66-0387
Revision of manuscript submitted 26 May 65.
Availability: Published in IEEE Transactions on Automatic Control vAC-10 n4 p477-8 Oct 1965.

Descriptors: (*Control, Theory), (*Stochastic processes, *Special functions (Mathematical)), Differential equations, Integration, Functional analysis.

Identifiers: Lyapunov functions.

AD-641 079 **Field 12B**
Not available from CFSTI.
Brown Univ., Providence, R. I. Div. of Applied Mathematics.
SUFFICIENT CONDITIONS FOR THE OPTIMALITY OF A STOCHASTIC CONTROL.
by Harold J. Kushner. 19 Jul 65, 12p
Grants AF-AFOSR-693-65, NGR-40-002-015
Proj. AF-9749
Task 974901
AFOSR-66-0756
Availability: Published in J. Siam Control v3 n3 (SerA) p499-508 1966.

Descriptors: (*Optimization, *Control), (*Diffusion, Control), Stochastic processes, Differential equations, Matrix algebra.

This paper is concerned with the optimal control of diffusion processes governed by a vector stochastic differential equation, where both the control and equation coefficients are subject to local Lipschitz conditions, and the terminal time is the (random) time of entrance to a given set. Sufficient conditions for optimality which do not require compactness of the state space are obtained. The optimal control corresponding to a stochastic version of a minimum average time problem is obtained. (Author)

AD-641 114 **Field 12B, 9C**
CFSTI Prices: HC$4.00 MF$0.75
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
FUNCTIONAL ANALYSIS OF SYSTEMS CHARACTERIZED BY NONLINEAR DIFFERENTIAL EQUATIONS.
Technical rept.,
by Robert Bruce Parente. 15 Jul 66, 118p TR-444
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2495
Proj. DA-200-14501-B31F
Doctorial thesis. Supported in part by Grants PHS-MH-04737-05, NSF-G-496.

Descriptors: (*Functional analysis, *Nonlinear differential equations), (*Systems engineering, Functional analysis), Low-pass filters, Series, Resonance, Commutators, Varactor diodes, Frequency multipliers, Suspension devices, Oscillation, Magnetic fields, Nonlinear systems, Stochastic processes.

Identifiers: Theses, Pendulums.

An analysis, by functional calculus, of a class of nonlinear systems is presented. The class of nonlinear systems that are analyzed includes all those analytic systems that are characterized by nonlinear differential equations. Applications of this analysis are shown for several actual nonlinear physical systems that are analytic. The precise definition of an analytic system is given. Loosely speaking, an analytic system is any system with these three properties: (i) It is deterministic. (For a given input signal, the system can have one and only one corresponding output signal.) (ii) It is time-invariant. (iii) It is 'smooth.' (The system cannot introduce any abrupt or switchlike changes into its output. All such changes in the output must be caused by the input rather than the system.) Given a nonlinear differential equation, the conditions are shown under which it characterizes an analytic system. Given an analytic system characterized by a nonlinear differential equation, it is shown how that system can be analyzed by an application of functional calculus. Specifically, an inspection technique is developed whereby a Volterra functional power series is obtained for that system's input-output transfer relationship. (Author)

AD-641 150 **Field 12B**
Not available from CFSTI.
California Univ., Berkeley.
OPTIMUM LOCATIONS ON A GRAPH WITH PROBABILISTIC DEMANDS,
by H. Frank. 1 Nov 65, 14p
Grant DA-ARO (D)-31-124-G576
AROD-5177:6
Availability: Published in Operations Research v14 n3 p409-21 May-Jun 1966.

Descriptors: (*Optimization, *Graphics), Operations research, Probability, Statistical analysis.

The traffic demands at the stations of a communication network are usually not deterministic. Optimum locations found using deterministic techniques are poor when the random nature of the network traffic is considered. The concepts of absolute centers and medians are generalized to maximum probability absolute centers and medians. Minimum variance points are also considered. Techniques to locate these optimum points are discussed. (Author)

AD-641 165 **Field 12B**
Not available from CFSTI.
California Univ., Los Angeles. Dept. of Engineering.
OPTIMAL CONTROL PROBLEMS IN BANACH SPACES.
Revised ed.,
by A. V. Balakrishnan. 10 Mar 65, 32p
Grant AF-AFOSR-700-65
Proj. AF-9749
Task 974901
AFOSR-66-0198
Revision of manuscript submitted 19 Feb 65. Presented at the Symposium on the Mathematical Theorems of Optimal Control, Michigan Univ., Ann Arbor, 5-7 Oct 64.
Availability: Published in J. SIAM Control SerA v3 n1 p152-80 1965.

Descriptors: (*Functional analysis, *Control), (*Optimization, Control), Partial differential equations, Measure theory.

This paper is concerned with a systematic study of a class of control problems in which the state and input or control variables are allowed to range in Banach spaces. Specifically, the state equation is of the form $x(t) = f(x(t), u(t), t)$, where for each t, u (t) and x (t) are Banach space valued. This extension to infinite dimensions is more than of purely mathematical interest. In the first place, control problems involving distributed parameter systems where the state dynamics are described by partial differential equations are conveniently formulated in this way. Secondly, stochastic control problems can also be handled in this way. Thus, the study of control problems in Banach spaces has the merit of providing a measure of unification for a wide range of problems.

AD-641 171 **Field 12B**
Not available from CFSTI.
California Univ., Los Angeles. Dept. of Engineering.
SEMIGROUP THEORY AND CONTROL THEORY,
by A. V. Balakrishnan. 1965, 9p
Grant AF-AFOSR-700-65
Proj. AF-9749
Task 974901
AFOSR-66-0084
Availability: Published in Proceedings of the IFIP Congress 65 p57-63.

Descriptors: (*Control, Theory), (*Groups (Mathematics), Theory), Partial differential equations, Integral transforms, Functional analysis.

The paper is concerned with two classes of problems involving linear partial differential equations, which serve to illustrate the role that semigroup theory plays. In the spirit of this Congress the author uses specific examples. Although this entails some loss of generality, it is hoped that the examples are sufficiently indicative of the scope of the theory and the directions of generalization possible. (Author)

AD-641 186 **Field 12B, 9C**
CFSTI Prices: HC$4.00 MF$0.75
Illinois Univ., Urbana. Coordinated Science Lab.
SUBOPTIMAL FEEDBACK CONTROL OF SYSTEMS WITH RANDOM PARAMETERS,
by Ronald A. Werner. Sep 66, 111p R-323
Contract DA-28-043-AMC-00073 (E)
Proj. DA-20014501B31F

Descriptors: (*Control systems, Feedback), Sensitivity, Stochastic processes, Optimization, Electric motors, Control, Design.

Identifiers: Theses.

This thesis relates the theory of optimal control with the concept of sensitivity. It deals with the following problem. Suppose one wants to design an optimal controller for a system that has a variable input and contains unknown random parameters. The controller must generate an optimal control for each allowed input and all allowed values of the random parameters. However, the controller cannot measure the parameters directly; it can only measure the input to the system and the output of the system. Hence, it is a feedback controller that generates the optimal control for all allowed inputs and systems. This thesis gives a method for finding a suboptimal solution to the above problem; however, the approximation of the optimal solution can be made to any desired degree of accuracy. For, the suboptimal solution is a partial sum of an infinite series that converges to the optimal solution to the problem. (Author)

AD-641 200 **Field 12B**
Not available from CFSTI.
California Univ., Los Angeles. Dept. of Engineering.
A SUFFICIENT CONDITION FOR THE EXISTENCE OF AN ADMISSIBLE CONTROL FOR A CLASS OF OPTIMIZATION PROBLEMS,
by Morton Donald Schwartz. 3 Aug 65, 9p
Grant AF-AFOSR-62-68
Proj. AF-9749
Task 974901
AFOSR-66-2151
Presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, 7-11 Nov 65, at Chicago, Ill.
Availability: American Society of Mechanical Engineers, 345 E. 47th St., New York, N. Y., 10017, $1.50 per copy/$0.75 to ASME members.

Descriptors: (*Optimization, *Control), Boundary value problems, Operators (Mathematics).

The paper considers a sufficient condition for the existence of an admissible control which transfers the state of a system from an initial to a final value subjected to a constraint. The concept of the modified adjoint operator is introduced such that the control satisfies the two-point boundary value problem and is proportional to the modified adjoint operator. The applicability of the sufficient condition is compared with that of the necessary and sufficient condition by means of several examples. (Author)

AD-641 261 **Field 12B**
CFSTI Prices: HC$6.00 MF$1.50
Office of Naval Research, Washington, D. C.
INVESTIGATION OF NONLINEAR CONTROL SYSTEMS. PART 7. STATISTICAL TRENDS IN CONTROL THEORY,
by Nicholas Minorsky. Mar 66, 280p
Projs. NR-041-226, RR-003-01-01
Partially supported by Contract N62558-2167.

Descriptors: (*Control systems, Nonlinear systems), (*Statistical processes, Control), (*Control, Theory), Probability, Polynomials, Integral transforms.

This report presents a review of the general scope of efforts and results on the statistical or non-deterministic aspects of control theory. Emphasis is placed on reporting the results for nonlinear control systems and on reviewing the Russian work in this area. The first six chapters reproduce in an abridged manner the principal topics of Pougacev's book 'Theory of Random Functions,' Moscow, 1962, omitting all material that is not directly connected with control theory. The remainder of the report surveys those aspects of statistical nonlinear control theory which are important for engineering applications. A section deals with the problem of a random disturbance acting on a relay oscillating periodically. A number of problems associated with extremal systems are considered in the last chapter. This is presented in the spirit of an engineering synthesis rather than from a general point of view. (Author)

N66-32133 **Field 12B**
CFSTI Prices HC$2.00 MF$0.50
Rutgers Univ., New Brunswick, N. J. Statistics Center.
TWO-STAGE CHAIN SAMPLING INSPECTION PLANS WITH DIFFERENT SAMPLE SIZES IN THE TWO STAGES.
by H. F. Dodge, and K. S. Stephens. Apr 66, 45p
NASA-CR-76626, N-23
Contract NONR-404(18)
Supported In Part By Nasa

Descriptors: *Markov chain, *Quality control, *Sampling, Control, Operation, Probabil-

ity, Quality, Sequence, Size, Stage, Statistical, Two.

For abstract, see STAR 04 17.

AD-640 651 **See Field 5A**

AD-640 927 **See Field 9C**

AD-641 084 **See Field 15G**

AD-641 170 **See Field 5A**

AD-641 193 **See Field 12A**

AD-641 195 **See Field 12A**

AD-641 196 **See Field 9B**

AD-641 248 **See Field 9D**

AD-641 266 **See Field 9D**

13A. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-640 947 **Field 13A, 13F, 6H**
Not available from CFSTI.
National Research Council of Canada, Ottawa (Ontario). Div. of Biosciences.
DESIGN OF AN AIR CIRCULATION SYSTEM FOR REFRIGERATED TRUCKS,
by C. P. Lentz, and E. A. Rooke. 1965, 4p
NRC-8965
Availability: Published in unidentified journal.

Descriptors: (*Cooling + ventilating equipment, Cargo vehicles), (*Ventilation, Cargo vehicles), (*Frozen foods, Cooling), Design, Canada.

The purpose of the paper is to outline the tests that were made in designing and proving an air circulation system that ensures temperatures of 0F or lower in refrigerated trucks, without additional insulation beyond the 3-5 inches presently used in most vehicles hauling frozen foods, without increasing the size of the refrigeration unit generally used in these vehicles, and at little increase in cost of construction. (Author)

AD-641 105 **Field 13A, 20M, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THERMOELECTRIC COOLING,
by Z. Poslt. 12 Apr 66, 24p FTD-TT-65-1762
TT-66-62516
Unedited rough draft trans. of Sdelovaci Technika (Czechoslovakia) v12 n7 p248-52 1964.

Descriptors: (*Thermoelectricity, *Cooling), (*Peltier effect, Reviews), (*Semiconductor devices, Peltier effect), Economics, Design, Heat transfer, Thermodynamics, Electrical properties, Performance (Engineering), Materials, Czechoslovakia.

Identifiers: Thermoelectric cooling devices.

A review is given of the advantages and physical principles of thermoelectric cooling. Particular attention is given to the design and performance characteristics of thermoelements developed by the A.S. Popov VUST.

AD-641 199 **Field 13A, 11G, 13B, 13M K**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
COOLING WATER FOR FALLOUT SHELTERS.
Final rept.,
by F. Hughes-Caley. Mar 66, 68p
Contract OCD-PS-64-201
Proj. SRI-4949-490

Descriptors: (*Fallout shelters, *Coolants), (*Water, Coolants), Water wells, Cooling + ventilating equipment, Feasibility studies.

The objective of the research was to determine the feasibility of prospecting for, tapping, and recovering ground water, working from within fallout shelter boundaries, for use as a shelter ventilating air coolant. A literature search was made into the background of established techniques of soil penetration and well construction, with particular emphasis on those that might lend themselves to manual operation in the event of a complete absence of power. The background study permitted an assessment of the relative practicability of existing techniques in the light of the limiting circumstances of fallout shelter environment. (Author)

N66-30118 **Field 13A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A NEW CONCEPT TO THE GENERAL UNDERSTANDING OF THE EFFECTS OF LONGITUDINAL CONDUCTION FOR MULTISTREAM COUNTERFLOW HEAT EXCHANGERS.
by C. L. Dan, R. R. Head, and N. E. Welch. 27 Apr 66, 39p NASA-TM-X-53454

Descriptors: *Conduction, *Gas flow, *Heat exchanger, *Stream function, Analysis, Correction, Counterflow, Equation, Exchange, Formula, Function, Heat, Longitudinal, Magnitude, Mathematics, Model, Stream.

For abstract, see STAR 04 17.

AD-640 727 **See Field 22B**

13B. CIVIL ENGINEERING

AD-640 544 **Field 13B, 11K**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
DETOXICATION AND DISPOSAL OF CRESOL-CONTAINING WASTE FROM CLEANING OPERATIONS,
by S. A. Matuska. 26 Sep 66, 4p NAEC-AML-2504
Proj. NAVAIRSYSCOM-A320-013-200/1

Descriptors: (*Cleaning compounds, Disposal), (*Phenols, Cleaning compounds), Sewage, Processing, Specifications.

Identifiers: Cresols.

Several of the cleaning compounds used by the field activities engaged in maintenance and overhaul work contain cresol, or other phenolic compounds as ingredients in their formulations. Elimination of ingredients of this type was considered necessary since their biocidal properties made their ultimate discharge into sewage systems objectionable. However, its elimination from all cleaning compound formulations has not been accomplished. Until such a time as cresol and other phenolic compounds have been totally eliminated, it is felt that the minimal amounts of these materials remaining in use can be rendered safe for disposal by suitable pretreatment. Adequate pretreatment could be economically accomplished by either of the two processes currently used by industry. These consist of removing the cresols by steam stripping and recovery for future use, or by acidification and disposal of the cresol-bearing layer by burning.

AD-640 831 **Field 13B, 8H, 6C**
Not available from CFSTI.
Delaware Univ., Newark. Marine Lab.
SOME THOUGHTS ON WATER POLLUTION,
by Charles G. Wilber. 1966, 6p
Grant AF-AFOSR-997-66
Proj. AF-9777
Task 977701
AFOSR-66-0836
Availability: Published in Delaware Conservationist v10 1966.

Descriptors: (*Water pollution, Toxicity), Fishes, Stress (Physiology), Atherosclerosis, Wastes (Industrial), Pathology, Rivers.

To set the background for stress related atherosclerosis in fish a review of what pollution does as a stress factor in the Delaware River is presented. It is pointed out that pollution, especially of industrial origin, stresses fish by causing pH changes, lowering dissolved oxygen, increasing turbidity, changing temperature, causing direct toxicity, etc. A priori one then suggests that stress responses (e.g. atherosclerosis) would be found in a population of fish so affected. (Author)

PB-173 266 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.75
West Virginia Center for Appalachian Studies and Development, Morgantown.
ROADSIDE PLANNING AND ZONING FOR WEST VIRGINIA. INCLUDING LEGISLATIVE RECOMMENDATIONS,
by Anthony H. Stocks, Londo H. Brown, and Marlyn E. Lugar. Aug 65, 71p Research rept.
RR-4, rept. no. 0018
Proj. SRC-10
Report on Land Use and Planning Control Study. Prepared in cooperation with West Virginia State Road Commission and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Urban planning), (*West Virginia, Roads), Law, Buildings.

The report provides information about the need for roadside planning and zoning and a proposed bill to accomplish this. Photographs are used to show how much some type of roadside protection is needed. These photos illustrate strip development, inadequate building setbacks, encroaching signs, incompatible uses, as well as several illustrations of well-planned development. The study staff recommends protective strips along State highways not to exceed 1,000 feet deep on each side of the highway. Within these strips a Board (to be composed of the Commissioner of Commerce, the State Road Commissioner, among others) would regulate the types of land uses permitted as well as the location, height, size, and appearance of buildings. (Author)

PB-173 268 **Field 13B, 5C**
CFSTI Prices: HC$3.00 MF$0.75
West Virginia Center for Appalachian Studies and Development, Morgantown.
A PILOT STUDY OF HIGHWAY-ORIENTED BUSINESS DEVELOPMENT AT NON-URBAN INTERSTATE INTERCHANGE AREAS,
by Robert D. Fowler. Sep 65, 68p Research rept.
RR-3, rept. no. 0081
Proj. SR-10
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, *Commerce), Rural areas, Management planning, Statistical analysis.

Identifiers: Highway interchanges.

The report is based on the limited and partial analysis of the development of highway-oriented businesses at Interstate highway interchange areas. It treats 79 interchanges in 9 States in the eastern part of the United States. The method is multilinear regression analysis. Dependent variables are the numbers of gasoline pumps, restaurant seats, and motel rooms in the area. Independent variables are the number of years the interchange had been open, the distance from the interchange to the center of the nearest city, and the population of the nearest city. The objective of the analysis was to establish a predictive model using age of the interchange and the size and distance away of the nearest city to develop information about highway services in the interchange area. In general, the results were negative. The only relationship

established of any significance was between the number of motel rooms and the population of the nearest city but even here the relationship explains only 17.1 percent of the variation in the data. The major conclusion of the report is that the relationship between the variables chosen if analysis cannot be described by linear equations.

PB-173 273 **Field 13B**
CFSTI Prices: HC$5.00 MF$1.00
West Virginia Center for Appalachian Studies and Development, Morgantown.
STATE LEGISLATION GOVERNING PLANNING AND LAND-USE CONTROLS AND THE VALUE OF PLANNING AND CONTROLS IN FOSTERING HIGHWAY PROTECTION AND ECONOMIC DEVELOPMENT - WITH PARTICULAR REFERENCE TO WEST VIRGINIA AND BORDERING STATES,
by Anthony H. Stocks, Londo H. Brown, and A. Craig Meck. Nov 65, 188p Research rept. RR-1, Rept. no. 0150
Proj. SRC-10
Report on Land Use and Planning Controls Study Prepared in cooperation with State Road Commission of West Virginia and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Urban planning), (*West Virginia, Roads), Law, Management planning, Maps.

The report includes summary information about land use planning measures--zoning, subdivision controls, official maps, access controls from State highways--from a survey of all the States. Comparison of State permissive legislation for controlling land use in West Virginia with such measures in the neighboring States of Kentucky, Maryland, Ohio, Pennsylvania, and Virginia shows that West Virginia's provisions are as extensive as those of any bordering State. The authors do make certain recommendations for improvements in West Virginia, e.g., municipal authority to plan beyond their borders, a roadside zoning board, and official mapping powers for municipalities and for the State Road Commissioner.

PB-173 275 **Field 13B**
CFSTI Prices: HC$1.00 MF$0.50
West Virginia Center for Appalachian Studies and Development, Morgantown.
LAND-USE REGULATION TO PROMOTE HIGHWAY OBJECTIVES IN WEST VIRGINIA: A RESEARCH SUMMARY,
by Robert D. Fowler. May 66, 19p Rept. no. 0513
Proj. SRC-10
Report on Land-Use and Planning Controls Study. Prepared in cooperation with Bureau of Public Roads, Washington, D. C. and State Road Commission of West Virginia.

Descriptors: (*Roads, Urban planning), (*West Virginia, Roads), Law, Safety, Management planning.

The paper surveyed the fundamental contributions that comprehensive roadside planning and land-use regulation can make in promoting highway safety, aesthetics, and the preservation of highway carrying capacity. It has also reviewed the status of planning and land-use control in West Virginia and offered some proposals to further highway objectives through the police powers. Since economic growth typically transcends city boundaries and the limits of urban counties, land-use regulation must be extended in like manner if it is to protect public health, welfare and the highway system. Thus, comprehensive roadside planning and land-use control is a necessity, not a luxury, if rational development and highway protection are to be obtained.

PB-173 277 **Field 13B**
CFSTI Prices: HC$5.00 MF$1.00
Wyoming Univ., Laramie. Natural Resources Research Inst.
LATERAL CRACKING OF ASPHALTIC CONCRETE PAVEMENT.
Interim rept.,
by Donald R. Lamb, and Raymond D. Pavlovich. Aug 65, 177p Rept. no. 0547, Research pub-H-11
Prepared in cooperation with Wyoming Highway Dept. and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Asphalt, Pavements), (*Concrete, Pavements), (*Pavements, Fracture (Mechanics)), Thermal stresses, Joints, Roads.

The report concludes that lateral cracks and consequent failure of portions of the study area are non-load associated. Cracks appear to be the result of thermally induced stresses that exceed the strength of the asphaltic concrete surface course. (Author)

PB-173 281 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.50
West Virginia Center for Appalachian Studies and Development, Morgantown.
PLANNING AND LAND-USE REGULATION IN WEST VIRGINIA - WITH EMPHASIS ON HIGHWAY OBJECTIVES,
by Robert D. Fowler, and Anthony H. Stocks.
Jul 65, 57p Rept. no. 0483, Research rept. RR-2
Prepared in cooperation with Bureau of Public Roads, Washington, D. C. and State Road Commission of West Virginia. Report on Land Use and Planning Controls Study.

Descriptors: (*Roads, Urban planning), (*West Virginia, Roads), Management planning, Law.

The report explains the extent and content of State permissive planning legislation in West Virginia and evaluates the specific contributions which State, county, and municipal planning can make in promoting rational growth and in developing a safe and efficient highway network; and, points out the merits of county and municipal land-use controls in protecting highway investments. The report determines the extent to which State permissive legislation relating to planning and land-use controls has been utilized. The degree of uniformity in zoning and subdivision regulations is analyzed for jurisdictions which have these restrictions. Usefulness of planning controls in meeting the highway objectives enumerated above are evaluated with respect to their extent and comprehensiveness. The researchers found that there appeared to be a need to reevaluate existing controls and regulations in residential zones and also commercial and industrial zones.

PB-173 323 **Field 13B**
CFSTI Prices: HC$5.00 MF$1.00
Smith (Wilbur) and Associates, New Haven, Conn.
FISCAL PROGRAMS FOR OKLAHOMA HIGHWAYS.
1964, 154p
Availability: Original document in color until exhausted.

Descriptors: (*Roads, *Oklahoma), (*Budgets, Roads), Costs.

The highway fiscal study seeks to point out the solution to this problem by evaluating: (1) Adequacy of present revenues; (2) Equitable distribution of funds; (3) Cost responsibility of highway beneficiaries; (4) Sources of additional revenues. (Author)

PB-173 324 **Field 13B**
CFSTI Prices: HC$20.90 MF$1.25
Smith (Wilbur) and Associates, New Haven, Conn.
NASHVILLE METROPOLITAN AREA TRANSPORTATION STUDY. VOLUME II. ORIGIN-DESTINATION SURVEY STATISTICAL DATA.
1961, 213p
Availability: Original document in color until exhausted. See also PB-173 325.

Descriptors: (*Transportation, *Tennessee), (*Roads, Tennessee), Statistical data, Tables.

PB-173 325 **Field 13B**
CFSTI Prices: HC$11.60 MF$0.75
Smith (Wilbur) and Associates, New Haven, Conn.
NASHVILLE METROPOLITAN AREA TRANSPORTATION STUDY. VOLUME I. ORIGIN-DESTINATION SURVEY AND MAJOR ROUTE PLAN.
1961, 117p
Availability: Original document in color until exhausted. See also PB-173 324.

Descriptors: (*Transportation, *Tennessee), (*Roads, Tennessee), Traffic, Construction, Costs.

Contents: Existing traffic conditions; Origin destination survey; Travel characteristics in 1959; 1980 travel patterns; Proposed major highway and street system; Traffic assignments; Recommended design standards; Construction costs - major street system.

PB-173 326 **Field 13B**
CFSTI Prices: HC$4.00 MF$0.75
Pennsylvania Dept. of Highways.
PENN JERSEY TRANSPORTATION STUDY. VOLUME II. 1975 PROJECTIONS, FOREGROUND OF THE FUTURE.
1964, 120p
Availability: Original document in color until exhausted. Prepared in cooperation with Bureau of Public Roads, Washington, D. C. See also PB-173 327.

Descriptors: (*Pennsylvania, Transportation), (*New Jersey, Transportation), Roads, Urban areas, Economics, Employment, Site selection, Commerce, Population, Industries, Maps, Flow charting, Management planning, Traffic, Distribution (Economics).

The volume is the second general report issued by the Penn Jersey Transportation Study (PJ) concerning the basic transportation problems of the nine-county metropolitan region centered around the cities of Camden, Philadelphia, and Trenton. It describes the Study's forecasts of activities in the region by 1975.

PB-173 327 **Field 13B**
CFSTI Prices: HC$5.00 MF$1.00
Pennsylvania Dept. of Highways.
PENN JERSEY TRANSPORTATION STUDY, VOLUME I. THE STATE OF THE REGION.
1964, 177p
Availability: Original document in color until exhausted. Prepared in cooperation with Bureau of Public Roads, Washington, D. C. See also PB-173 326.

Descriptors: (*Pennsylvania, Transportation), (*New Jersey, Transportation), Roads, Urban areas, Economics, Employment, History, Commerce, Population, Industries, Maps, Tables, Management planning, Traffic, Distribution (Economics).

The first stage of the operations of the PJ Transportation Study is a survey of the state of the PJ region, and recent trends in it, with a view to gauging the size and nature of its transportation and developmental problems. This review of the region is focused upon the salient distributional aspects of the metropolitan region - the location of its population and their daily activities - and on the relation between this distribution and the transportation system which ties it together. (Author)

PB-173 329 Field 13B
CFSTI Prices: HC$3.00 MF$0.75
Automotive Safety Foundation. Washington, D. C.
HIGHWAY FACTS IN MISSOURI: ROADS, STREETS, AND HIGHWAYS.
1 Dec 60, 74p
Availability: Original document in color until exhausted. Prepared in cooperation with Bureau of Public Roads, Washington, D. C., for The Missouri State Highway Commission, Jefferson City.

Descriptors: (*Roads, *Missouri), Pavements, Costs, Management engineering.

PB-173 330 Field 13B
CFSTI Prices: HC$4.00 MF$1.00
Pennsylvania Dept. of Highways.
PENN JERSEY TRANSPORTATION STUDY, VOLUME III. 1975 TRANSPORTATION PLANS.
1965, 138p
Availability: Original document in color until exhausted. Prepared in cooperation with Bureau of Public Roads, Washington, D. C. See also PB-173 326.

Descriptors: (*Pennsylvania, Transportation), (*New Jersey, Transportation), Roads, Urban areas, Tests, Costs, Economics, Traffic, Population, Distribution (Economics), Management planning, Flow charting, Maps.

The forecasted 1975 development pattern for the region, presented in PJ REPORTS, VOLUME 2, were used as the basis for determining the structure of 1975 travel patterns and travel demands. These travel projections, in turn, were employed in testing the 1975 alternative transportation plans presented in volume III.

PB-173 331 Field 13B
CFSTI Prices: HC$4.00 MF$0.75
Jorgensen (Roy) and Associates, Gaithersburg, Md.
OKLAHOMA HIGHWAY NEEDS, AN ENGINEERING APPRAISAL.
Dec 64, 112p
Prepared in cooperation with Benham Engineering Co., Oklahoma City, Okla. Availability: Original document in color until exhausted.

Descriptors: (*Oklahoma, *Research program administration), (*Systems engineering, Roads), Management planning, Budgets, Maintenance, Transportation, Reports, Passenger vehicles, Urban areas, Urban planning, Safety.

Identifiers: Highway Research.

The study includes individual reports for each of the 77 counties in the State. The primary function involved the determination of existing improvement needs, a forecast of additional needs which must be anticipated for the future and an estimate of requirements for maintenance and administration. Recommendations are made for desirable levels of improvement and for legislative and administrative actions to implement effective highway, road and street programs throughout the State. (Extracted)

PB-173 332 Field 13B
CFSTI Prices: HC$1.00 MF$0.50
Smith (Wilbur) and Associates, New Haven, Conn.
HIGHWAY NEEDS AND FISCAL PROGRAMS FOR OKLAHOMA.
Summary rept. 1963-64.
Dec 64, 20p
Availability: Original document in color until exhausted.

Descriptors: (*Oklahoma, *Research program administration), (*Systems engineering, Roads), Management planning, Budgets, Maintenance, Transportation, Passenger vehicles, Reports, Urban areas, Urban planning, Construction, Safety.

Identifiers: Highway research.

To keep Oklahoma moving ahead with better facilities for increasing traffic, the 1963 Legislature called for a comprehensive appraisal of the State's entire highway, road and street network. As outlined in House Concurrent Resolution No. 504, this included classification of systems, evaluation of improvement needs and analysis of financial requirements and capabilities. The Highway Needs Study, started in the summer of 1963, was conducted under the direction of the Legislative Council's Committee on Roads and Highways, assisted by officials and staff of the State Department of Highways - in cooperation with the U. S. Department of Commerce, Bureau of Public Roads. Results of the study provide information necessary for full understanding of Oklahoma's highway transportation problems and a plan for development of adequate improvement programs for highways, roads and streets. They provide a basis for legislative action and for administrative, engineering and fiscal decisions by state, county and city highway officials. Complete documentation of the study procedures, findings and recommendations is contained in several publications, including two major reports: 'Oklahoma Highway Needs' (PB-173 331) and 'Fiscal Programs for Oklahoma Highways.' (Author)

PB-173 333 Field 13B
CFSTI Prices: HC$1.00 MF$0.50
Smith (Wilbur) and Associates, New Haven, Conn.
UTAH'S FUTURE HIGHWAY PROGRAMS 1964-1983.
Summary rept.
1965, 21p
Availability: Original document in color until exhausted.

Descriptors: (*Roads, Management planning), (*Utah, Roads), Costs, Budgets, Federal budgets.

Deficits in revenue under the recommended classification system occur at the county and city levels of government. Highway finance at the local level is principally a responsibility of the general public, and revenue projections indicate that additional general fund revenues should be provided for road and street improvement programs. Following completion of the Interstate System, additional federal-aid revenues may be available to Utah for major improvement programs. However, these funds and the programs under which they would be administered are uncertain. It is believed that very little additional money may be available to offset highway needs determined through the study. Several possible sources of additional revenues are available to the state from traditional highway-user revenues. Of the four most likely sources of additional highway-user revenues, only the additional tax on motor fuel would apply generally to all highway users. It would appear reasonable to increase the tax on all motor fuels by one cent per gallon with a possible increase in automobile registration fees of $5.00 if it is desired to accelerate the highway improvement program. (Author)

PB-173 343 Field 13B
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Public Roads, Washington, D. C.
SHORTCUT TO INTERSECTION CAPACITY; CALIBRATING A GRAVITY MODEL WITH DATA FROM SELECTED ZONES; HOUSEHOLD TRIP PRODUCTION - RESULTS OF A NATION-WIDE SURVEY,
by C. F. McCormack, Art Carter, Kevin E. Heanue, and Chris Fleet. Aug 65, 25p Highway planning TR-2

Descriptors: (*Roads, Traffic), (*Traffic, Measurement), Volume, Calibration, Mathematical analysis, Mathematical models.

The clustered survey provided sufficient trip data for the development of zonal estimates of trip production. The clustered survey did not provide enough trip data for the development of trip attraction estimates. The traveltime factors developed from the clustered survey were significantly different from those developed with the total study area data. (Author)

PB-173 344 Field 13B
CFSTI Prices: HC$3.00 MF$0.50
Bureau of Public Roads, Washington, D. C.
PROGRAMMING AND SCHEDULING HIGHWAY IMPROVEMENTS,
by Palmer N. Stearnes, and Dwight A. Hodgens.
Apr 66, 43p Highway Planning TR-4

Descriptors: (*Roads, *Management planning), Scheduling, Computers, Management engineering.

The years since the passage of the Federal Highway Act of 1956 have witnessed a dramatic growth in the volume of highway construction. The task of planning, designing, acquiring right-of-way, constructing, and maintaining highways has evolved from a relatively simple task to a major undertaking requiring the most up-to-date and efficient management practices of which programing and scheduling are parts. Programs and schedules serve many purposes. They are the overall plan for effective investment of capital outlay for the extension and improvement of highway systems in an efficient and equitable manner. In turn, they form the basis for determining the resources required each year to execute the plan. This paper is an attempt to fit programing and scheduling into the total management process and to bring together the principles involved to promote a better understanding of the process. The emphasis of the report is placed more on scheduling than on programing since considerable effort by the highway industry has already gone into the development of programing procedures and philosophy. (Author)

PB-173 351 Field 13B
CFSTI Prices: HC$4.00 MF$0.75
North Carolina State Univ., Raleigh. Dept. of Engineering Research.
THE EFFECT OF VISCOSITY OF ASPHALT ON THE PROPERTIES OF BITUMINOUS MIXTURES WEARING SURFACE MIXTURES,
by Richard Bright, Boyd Steed, John Steele, and Alan Justice. Jun 64, 105p Rept. no. 0189 Proj. ERD-110-L
Prepared in cooperation with North Carolina State Highway Commission, Bureau of Public Roads, Washington, D. C. and National Bituminous Concrete Association.

Descriptors: (*Asphalt, Test methods), (*Viscosity, Temperature control), Roads, Pavements, Bituminous coatings, Gravel, Binders.

Identifiers: Highway engineering.

Twenty four, 600 foot test strips of a 1" bituminous concrete wearing surface were laid in which mixing viscosities of the asphaltic binder were varied from approximately 900 to 40 Saybolt Furol Seconds. Twelve strips had crushed granite as the coarse aggregate and twelve other strips had a silicious gravel as coarse aggregate. For each set of twelve strips, three replications of mix temperature were used to give the desired range of mix viscosities. The 85 to 100 penetration asphalt source remained constant for all strips. Modified Ross Counts were made on the mixes, laying characteristics were observed, and density samples were cut from the finished pavements. While the pavement was compacted temperatures were measured at four different elevations in the pavement layer. Cores were cut from the pavements at 4, 9, and 21 months and penetrations and viscosities determined on the recovered asphalt. There appeared to be no marked differences in the mixing and laying characteristics of the mixes made at the wide range in viscosity. The average compaction obtained with the cold mixes was slightly less than that obtained at higher mix temperatures. The

mixes made at low mix temperatures show a larger retained penetration immediately after mixing than those made at the higher mix temperature. However, after laying, the strips made at the lower mix temperatures hardened faster than those mixed at the higher temperatures; and after 21 months of service there was no great difference in the hardness of the strips. (Author)

PB-173 353 **Field 13B, 11I**
CFSTI Prices: HC$1.00 MF$0.50
California State Div. of Highways.
TRIAL INSTALLATION OF THERMOPLASTIC AND TRAFFIC MARKERS IN SNOW CONDITIONS.
Jun 66, 10p Rept. no. 0423
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Pavements, Traffic), (*Traffic, Safety), Passenger vehicles, Test methods, Thermoplastics, Epoxy plastics, Paints, Titanium compounds, Meteorological parameters, Wear resistance.

Identifiers: Highway markings.

Precast plastic as well as cured-in-place epoxy traffic lane markers were bonded into recessed grooves cut into concrete pavement to produce a marker flush with the surface. Their performance was compared to regular traffic paint under conditions of ice and snow at a location where paint fails rapidly. Those markers, notably the cured epoxies placed under damp and cold conditions, failed rapidly, while service was good when installed under favorable conditions. Good service should be possible under favorable installation conditions and where the depths of the pavement grooves are controlled.

PB-173 354 **Field 13B**
CFSTI Prices: HC$2.00 MF$0.50
Michigan Dept. of State Highways.
SIGN BRIGHTNESS IN RELATION TO LEGIBILITY.
Research rept.,
by T. M. Allen, G. M. Smith, M. H. Janson, and F. N. Dyer. Aug 66, 42p R-581
Proj. 62-G-118

Descriptors: (*Michigan, Research program administration), Experimental design, Brightness, Illumination, Luminescence, Lighting equipment, Test methods, United States government.

Identifiers: Highway signs.

Using an internally illuminated sign, various combinations of black-and-white letters and backgrounds were tested in the field at night under a wide range of ambient lighting conditions to determine the relationship between sign luminance and legibility. Three age groups for the observers were used. Contrast level and direction were controlled as well as the level of headlamp glare. Minimum and maximum brightness values are discussed for typical rural, suburban, and downtown urban ambient illumination conditions. If all signs were illuminated uniformly at 20 ft-L, legibility would be very good, even if luminances as low as 10 ft-L were allowed at the darkest part of the sign.

PB-173 361 **Field 13B, 8M**
CFSTI Prices: HC$3.00 MF$0.75
Colorado State Dept. of Highways. Planning and Research Div.
PAVEMENT STUDY - PROJECT I 092-2 (4).
Final rept.
1966, 49p Rept. no. 570
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Pavements, *Soil mechanics), (*Colorado, *Roads), Soil mechanics, Deformation, Volume, Loading (Mechanics).

In 1957 and 1958 Colorado constructed five concrete test sections of various designs in the southbound roadway of the Denver-Castle Rock portion of Interstate 25. The purpose of this experiment was to develop information on the behavior and requirements of rigid pavements constructed on swelling soils. Based on eight years of pavement performance, the following conclusions were drawn: (1) A-6 and A-7 soils have the capability of large volume change and should be considered as swelling soils; (2) standard AASHO T-99 compaction is necessary in at least the top 4 feet of fills and in subexcavated and backfilled cuts; (3) none of the test sections experienced much change in roughness during the eight-year period; (4) based on performance to date, the extra cost of the reinforcement is not justified when the subgrade soil swell is less than 3% and the subgrade has uniform AASHO T-99 moisture content and density. (BPR abstract)

PB-173 363 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.50
California State Div. of Highways.
REPORT ON THE DESIGN OF THE STRUCTURAL SECTION OF CITY AND COUNTY ROADS,
by Earle Shirley, and Duane Anderson. 6 Jun 66, 52p Rept. no. 576
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Design), (*Urban areas, Roads), (*Rural areas, Roads), Loading (Mechanics), Cargo vehicles, Pavements, Thickness, California.

The distribution of wheel loads on certain city streets and country roads is evaluated and a comparison is made with wheel loads found on state highways. The need for this study has long been the subject of discussion among engineers designing local roads with the use of wheel load criteria derived from trucks using the state highways. It was found that trucks using local roads, generally have lighter axle loads on a cumulative basis than trucks traveling on state highways. Truck constants were derived from the axle load data collected for this study. These truck constants exhibit a substantial reduction when compared with the state-wide truck constants for state highways. Sample designs are presented showing reductions in design thickness. A method for calculating truck constants is presented. Instructions to help with selection and operation of loadometer sites are also included in the appendix. (Author)

PB-173 365 **Field 13B, 8M**
CFSTI Prices: HC$1.00 MF$0.50
Louisiana Dept. of Highways. Research and Development Section.
HIGH-PRESSURE LIME INJECTION.
Research rept.,
by C. M. Higgins. Aug 65, 22p RR-17, IR-2
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Soils, Stabilization), (*Pavements, Stabilization), (*Louisiana, Roads), Calcium compounds, Oxides, Injection, Electroosmosis, Drilling, Plasticity, Soil mechanics.

Identifiers: Calcium oxides.

The report describes the high-pressure injection of a lime slurry into a hydraulic fill to evaluate the effectiveness of in-place lime treatment. Six experimental sections were studied: Sections 1, 2 and 3 were injected with a 0.5 percent of lime to depths of 5, 10 and 20 feet, respectively; sections 4, 5 and 6 were injected with 1.5 percent of lime to depths of 5, 10 and 20 feet, respectively. Samplings were made before treatment and one month after the lime injection. Data are given for Atterberg limits, volumetric shrinkage, PH value, calcium content, moisture content and unconfined compressive strength. It was concluded that (1) the lime had been satisfactorily distributed; (2) there was a trend toward lowering PI; (3) strength was increased little, if any; and (4) all in all, the lime treatment had improved the soil. (BPR abstract)

PB-173 367 **Field 13B, 13F**
CFSTI Prices: HC$7.15 MF$2.00
International Road Federation, Washington, D. C.
AN INTERIM REPORT COVERING A 17-COUNTRY INVENTORY. WORLD SURVEY OF CURRENT RESEARCH AND DEVELOPMENT ON ROADS AND ROAD TRANSPORT.
15 Jul 66, 414p
Contract CPR-11-2665

Descriptors: (*Roads, Reviews), (*Transportation, Reviews), Scientific research, Engineering, Argentina, Australia, Brazil, Canada, France, Germany, Erie, Italy, Japan, Mexico, New Zealand, Norway, Philippines, Portugal, Spain, Great Britain, Venezuela.

Results are given of a comprehensive survey of current and recently completed highway research and development projects conducted by Argentina, Australia, Brazil, Canada, France, Germany, Ireland, Italy, Japan, Mexico, New Zealand, Norway, Philippines, Portugal, Spain, United Kingdom, and Venezuela.

PB-173 414 **Field 13B**
CFSTI Prices: HC$1.00 MF$0.50
Texas Transportation Inst., Texas A and M Univ., College Station.
DRIVING PRACTICES FOR PRESTRESSED CONCRETE PILES.
Research rept.,
by T. J. Hirsch, and C. H. Samson, Jr. Apr 66, 8p RR-33-3
Proj. 2-5-62-33
Prepared in cooperation with Bureau of Public Roads, Washington, D. C. Report on Piling Behavior.

Descriptors: (*Texas, Civil engineering), (*Construction, Reinforced concrete), Spallation, Fracture (Mechanics), Stresses, Compressive properties, Reinforcing materials.

Identifiers: Pile driving, Piles (Structural).

The purpose of this paper is to briefly describe the phenomena which can cause cracking and spalling of prestressed concrete piles during driving and to outline procedures which will prevent these problems. In some cases of driving of prestressed concrete piles, cracking and spalling have been encountered and in most instances these problems can be avoided by following certain rules of good driving practices. The recommendations presented here are based on sound physical principles and have been proved effective in practice. (Author)

PB-173 420 **Field 13B**
CFSTI Prices: HC$6.00 MF$1.50
Maryland Univ., College Park. Dept. of Business Administration.
USER DETERMINED ATTRIBUTES OF IDEAL TRANSPORTATION SYSTEMS: AN EMPIRICAL STUDY,
by G. A. Brunner, S. J. Hille, A. N. Nash, F. T. Paine, and R. E. Schellenberger. Jun 66, 271p

Descriptors: (*Transportation, Public opinion), Attitudes, Acceptability, Statistical data, Population, Urban areas, Factor analysis, Correlation techniques, Traffic, Costs, Passenger vehicles, Feasibility studies.

The broad objectives of the Maryland research effort are (a) to identify and assess the importance of attributes of an ideal transport system or systems, and (b) to determine the extent to which existing systems approach this ideal. The pilot study, conducted in Baltimore and described in this report, represents the beginning phase of this effort. The study was designed to appraise the feasibility of using a measuring approach involving the use of a quasi self-administered questionnaire and to interpret the responses. (Author)

AD-641 199 See Field 13A

PB-173 246 See Field 5C

PB-173 364 See Field 13M

PB-173 369 See Field 11G

PB-173 370 See Field 11G

13C. CONSTRUCTION EQUIPMENT, MATERIALS, AND SUPPLIES

AD-640 974 See Field 13M

13D. CONTAINERS AND PACKAGING

AD-450 549 Field 13D
CFSTI Price: HC$1.00
Signetics Corp., Sunnyvale, Calif.
AN ECONOMICAL FLAT PACKAGE FOR INTEGRATED CIRCUITS.
Interim development rept. no. 1, 15 Jun-15 Sep 64.
15 Sep 64, 22p
Contract NObrs-91298

Descriptors: (*Packaging, Integrated circuits), (*Integrated circuits, Packaging), Circuit interconnections, Metal films, Chemical milling, Electroplating, Production, Manufacturing methods, Silicon, Aluminum.

The schedule for making the first seal of the metal leads to the package substrate is complete. By a process of electroplating and etching metal film interconnections have been laid down, but many problems remain in this area. A few circuits were assembled on this substrate and where all previous steps were satisfactory, electrical continuity has been established. (Author)

AD-640 579 Field 13D
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
CUSHIONING SYSTEM FOR ELECTRICAL CONTACT BRUSH ASSEMBLY,
by E. J. Lion. 7 Sep 66, 10p NAEC-AML-2502

Descriptors: (*Electric connectors, *Packaging), Expanded plastics, Packing materials, Alignment.

It is concluded that the pack utilizing unicellular polyethylene foam will provide protection necessary to retain the required co-planar alignment of contact points in normal transportation environments. Since the current pack without barrier materials weighs 22 ounces and the proposed pack 15 ounces, a net reduction of 7 ounces would be reflected in cost reductions on transportation charges.

AD-641 244 Field 13D, 14B
Not available from CFSTI.
Clarkson Coll. of Technology, Potsdam, N. Y.
LOW-COST LIQUID NITROGEN CONTAINER,
by M. C. Martin, and K. F. Welton. 27 Jul 66, 2p
Grant AF-AFOSR-794-65
Proj. AF-9763
Task 976301
AFOSR-66-1665
Availability: Published in American Journal of Physics v33 n12 p1090 Dec 1965.

Descriptors: (*Containers, Liquefied gases), Nitrogen, Isocyanate plastics, Cryogenics, Costs, Evaporation, Laboratory equipment.

A large bowl-shaped polyurethane container is described for use as a low-cost liquid nitrogen container.

AD-640 919 See Field 18L

13E. COUPLINGS, FITTINGS, FASTENERS, AND JOINTS

AD-640 857 Field 13E
CFSTI Prices: HC$5.60 MF$0.75
Forest Products Lab., Madison, Wis.
PHOTOELASTIC ANALYSIS OF SHEAR STRESS DISTRIBUTION IN ADHESIVE-BONDED LAP JOINTS,
by Dieter Kutscha. Jul 62, 55p TP-122
Prepared in cooperation with Bureau of Naval Weapons, Washington, D. C.

Descriptors: (*Bonded joints, Photoelasticity), Shear stresses, Adhesives, Stresses, Aluminum alloys.

A photoelastic analysis was made of the shear stress distribution in an .064-inch aluminum alloy, adhesive-bonded lap joint. The adhesive that was used was a photoelastic material. The stress distribution was studied directly on the adhesive itself in the joint as a function of increasing load and length of overlap of the adherends. The experimental distribution that was obtained was compared with that predicted by the theoretical analysis of Goland and Reissner. (Author)

N66-30860 Field 13E
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ALUMINUM O-RINGS FOR HIGH VACUUM USE.
by A. J. Hobbs, B. Seidenberg, and J. J. Webb. Jun 66, 15p NASA-TM-X-55542, X-713-66-280

Descriptors: *Aluminum, *High vacuum, *O-ring seal, Brazing, High, O ring, Rod, Seal, Soldering, System, Test, Vacuum, Welding.

For abstract, see STAR 04 17.

N66-31420 Field 13E
CFSTI Prices HC$6.00 MF$1.25
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROCEEDINGS OF THE CONFERENCE ON THE DESIGN OF LEAK-TIGHT FLUID CONNECTORS.
1965, 214p NASA-TM-X-57585
Conf. Held 4-5 Aug. 1965, Sponsored Jointly By Nasa And Sae

Descriptors: *Aerospace technology, *Conference, *Connector, *Joint, *Leakage, Aerospace, Brazing, Component, Cryogenics, Factor, Forming, High pressure, High temperature, Launch vehicle, Liquid, Propellant, Propulsion, Reliability, Sealing, Space vehicle, System, Technology, Weight, Welding.

For abstract, see STAR 04 17.

PB-173 267 Field 13E
CFSTI Prices: HC$1.00 MF$0.50
Fritz Engineering Lab., Lehigh Univ., Bethlehem, Pa.
BEHAVIOR OF FASTENERS AND PLATES WITH HOLES,
by John W. Fisher. Dec 65, 25p Fritz Reprint-280, rept. no. 063
Journal of the Structural Div., Proceedings of the American Society of Civil Engineers, Proc. Paper 4587 v91 St6 265-86 Dec 1965. Prepared in cooperation with Aureau of Public Roads, Washington, D. C.

Descriptors: (*Metal plates, Mechanical properties), (*Mechanical fasteners, Mechanical properties), Stresses, Bolts, Rivets; Strain (Mechanics), Shear stresses, Deformation.

Analytical expressions for the stress-strain relationship of a plate with holes and for the shear-deformation relationship of rivets and high-strength bolts were developed. Both expressions are necessarily applicable to the elastic and inelastic regions. The relationships for plates are applicable to low alloy, low carbon steels such as A7, A36, A242, A440 and A441, and are able to accomodate various specimen geometrics. The analytical expressions for the plate with holes can be adapted to changes in the geometric configuration as well as differences in the yield point and ultimate strength. The analytical models were compared with tests of plate specimens having two drilled holes and show good agreement. Among the variables checked were plate width, pitch or distance between the centers of holes, plate thickness and grade of steel. A continuous function was used to represent the load-deformation characteristics of a single bolt in shear. The shape of the curve was governed by the ultimate shear strength and two empirical parameters. These parameters varied for different fasteners and different types of connected material. The analytical model for the shear deformation relationship of mechanical fasteners was in agreement with the test data. (Author)

PB-173 269 Field 13E
CFSTI Prices: HC$1.00 MF$0.50
Fritz Engineering Lab., Lehigh Univ., Bethlehem, Pa.
WHAT HAPPENS TO BOLT TENSION IN LARGE JOINTS,
by James J. Wallaert, Gordon H. Sterling, and John W. Fisher. 1965, 6p Fritz Reprint-286, rept. no. 106
Fasteners v20 n3 4p 1965. Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Bolted joints, Stresses), Steel, Loading (Mechanics).

An experimental study was made of the changes in bolt tension in high-strength A325 and A490 bolts connecting A440 (high-strength) and A514 (constructional alloy) steel joints. Until major slip occurred in the large bolted joints, high-strength steel bolts lost little initial tension. The loss was due to plate contraction caused by the Poisson effect. After major slip, the bolts came into bearing and the variations in bolt tension became more pronounced. For bolts with a 4-in. grip, bolt tension decreased with an increase in joint load beyond the slip load. As the joint load approached its ultimate value, however, the bolts at the lap plate end began to show an increase in tension. This was brought about by the outward prying action of the lap plate. These results showed that the load transferred by friction at the ultimate joint strength was negligible. For bolts with an 8-in. grip, bolt tension increased as the joint was loaded beyond the slip load. This increase, caused by bending of the bolts, indicated that some load was being transferred by frictional resistance within the joint. However, because of the lap plate prying phenomenon, there was a clear separation of the faying surfaces near the joint end. Therefore, the bolt tension was not indicative of the normal force acting on the faying surface. For all joints, the bolts at the lap plate ends (under a higher combined shear and tension loading than the bolts at the main plate end) were usually the first to fail. (Author)

13F. GROUND TRANSPORTATION EQUIPMENT

AD-640 947 See Field 13A

AD-641 024 See Field 12B

AD-641 119 See Field 13J

PB-173 367 See Field 13B

13G. HYDRAULIC AND PNEUMATIC EQUIPMENT

N66-31932 **Field 13G**
CFSTI Prices HC$3.25 MF$1.00
Weston Hydraulics, Ltd., Van Nuys, Calif. Servo Controls Group.
PNEUMATIC DIGITAL ACTUATOR FOR THRUST VECTOR CONTROL FINAL TECHNICAL SUMMARY REPORT.
25 Oct 65, 163p NASA-CR-76471
Contract NAS8-11388

Descriptors: *Actuator, *Digital technique, *Pneumatic equipment, *Thrust vector control (tvc), Air, Analog, Binary, Control, Digital, Encoder, Engine, Equipment, Feasibility, Gimbal, Nitrogen, Pneumatic, Power, Reliability, Servo, Technique, Thrust, Vector.

For abstract, see STAR 04 17.

N66-32666 **Field 13G**
CFSTI Prices HC$2.00 MF$0.50
Consolidated Controls Corp., Bethel, Conn.
FLOW TEST ON MOCKED-UP CIRCUIT.
by C. W. Schoenfeld. 1 Feb 66, 29p NASA-CR-76975, CCC-541
Contract NAS8-11951

Descriptors: *Gas flow, *Impeller, *Velocity measurement, Air, Flow, Gas, Measurement, Pilot, Power, Reynolds number, Stability, Temperature, Tube, Turbulence, Velocity.

For abstract, see STAR 04 17.

N66-32670 **Field 13G**
CFSTI Prices HC$3.75 MF$1.50
Martin Co., Baltimore, Md.
HEAD TO HEAD TESTS OF THE HYDRODYNAMIC SUPPORT FOR SATURN V.
by H. Bone, W. R. Case, and F. T. Gordon. Dec 65, 247p NASA-CR-76854, ER-14036
Contract NAS8-11903

Descriptors: *Hydrodynamic stability, *Hydromagnetism, *Performance characteristics, *Saturn v launch vehicle, *Spacecraft performance, Characteristic, Damping, Design, Dynamic, Head, Launch vehicle, Mathematics, Model, Performance, Prediction, Saturn, Spacecraft, Stability, Test, Vibration.

For abstract, see STAR 04 17.

N66-32671 **Field 13G**
CFSTI Prices HC$3.00 MF$1.00
Martin Co., Baltimore, Md.
HEAD TO HEAD TEST PROCEDURES FOR THE HYDRODYNAMIC SUPPORT OF SATURN V.
1966, 126p NASA-CR-76853, ER-14035

Descriptors: *Function test, *Ground support system, *Hydrodynamics, *Saturn v launch vehicle, *Test method, Damping, Equipment, Flow, Function, Ground, Launch vehicle, Method, Operation, Procedure, Range, Resonance, Support, System, Test.

For abstract, see STAR 04 17.

N66-32678 **Field 13G**
CFSTI Prices HC$2.00 MF$0.50
Martin Co., Baltimore, Md.
RELIABILITY ANALYSIS AND CORRECTIVE ACTION SUMMARY FOR THE SATURN V HYDRODYNAMIC SUPPORT EQUIPMENT.
Nov 65, 45p NASA-CR-76655, ER-14038
Contract NAS8-11903

Descriptors: *Reliability, *Saturn v launch vehicle, *Support system, Component, Design, Failure, Function, Hydrodynamics, Launch vehicle, Mode, Model, Prediction, Saturn, Support, System, Test.

For abstract, see STAR 04 17.

N66-37576 **Field 13G**
CFSTI Prices HC$3.00 MF$0.75
Alabama Univ., University. Bureau Of Engineering Research.
STUDY OF THE STABILITY OF THE S-IC OPEN-LOOP PROPELLANT-HYDRAULIC SYSTEM FINAL REPORT, JUL. 26, 1964 - JUL. 26, 1966.
by D. N. Osteen, E. A. Reinhard, and W. C. Stapleton Jr. Aug 66, 86p NASA-CR-78391
Contract NAS8-11341

Descriptors: *Hydraulic system, *Saturn sic stage, Analog, Flexible, Hose, Loop, Open, Performance, Pressure, Propellant, Simulation, Stability, Test.

For abstract, see STAR 04 22.

13H. INDUSTRIAL PROCESSES

AD-463 412 **Field 13H**
CFSTI Price: HC$7.60
Goodrich (B. F.), Aerospace and Defense Products, Akron, Ohio.
PRESSURIZED BOW DOME OF A CABLE-REINFORCED RUBBER CONSTRUCTION FOR USE WITH AN/SQS-26 SONAR.
Quarterly summary ret. no. 22, 30 Sep-31 Dec 64,
by W. J. Berus. 31 Dec 64, 73p
Contract NObsr-89483
Proj. SS041-001
Task 8156

Descriptors: (*Sonar domes, Rubber), Sonar, Design, Manufacturing methods, Production, Acoustics, Performance (Engineering), Naval research, Feasibility studies, Aging (Materials), Tests, Test methods, Life expectancy, Hydrostatic pressure, Panels (Structural), Reliability, Experimental data, Tensile properties, Structural properties, Membranes, Test equipment.

The purpose of this project is to develop a rubber Bow Dome window having characteristics superior to the present steel domes when used with the AN/SQS-26 sonar. To accomplish this, a three-phase program was established. Phase 1--Determine the feasibility of design approaches for a pressurized, cable-reinforced, rubber acoustic window. Design, fabricate and test a representative panel: Phase 2--Design a complete rubber acoustic window for a Bow Dome. Design and procure the necessary tooling: Phase 3--Fabricate, test and deliver the window. (Author)

AD-640 613 **Field 13H, 12A**
CFSTI Prices: HC$3.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
SEQUENTIAL RECTIFYING INSPECTION OF FINITE LOTS.
Technical rept.,
by K. T. Wallenius. 1 Sep 66, 53p TR-120
Contract Nonr-225 (52)
Proj. NR-342-022

Descriptors: (*Sequential analysis, *Quality control), Sampling, Optimization.

A stopping rule for the process of sequential sampling inspection of finite lots is obtained which, with confidence 1-alpha, guarantees a prespecified upper confidence limit on the number of defective items in the uninspected portion of the lot. Usual assumptions of 'control' are not invoked here and, in that sense, the plans could be called nonparametric. Discussions of optimality and asymptotic results are included. (Author)

AD-640 639 **Field 13H, 20B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
FLOATING-ZONE REFINING BY ELECTRON BOMBARDMENT.
Physical sciences research papers,
by Marvin S. Brooks, E. Owen Fisk, and Bernard Rubin. Aug 66, 14p AFCRL-PSRP-254, AFCRL-66-544
Proj. AF-5620
Task 562005
Availability: Published in Semiconductor Products and Solid State Technology v8 n12 p34-4 Dec 1965.

Descriptors: (*Zone melting, Electron beam melting), (*Crystal growth, Zone melting), Purification.

A review of the technology of electron-beam zone refining as a purification and crystal growth technique is presented. The basic concepts and equipment requirements are given along with guidelines for determining the applicability of the technique to a given material. Tabulations of the purity and crystallinity of successfully electron-beam zone refined materials are given as well as pertinent physical parameters that are necessary for determining zone stability. (Author)

AD-640 695 **Field 13H, 11B**
CFSTI Prices: HC$1.60 MF$0.50
Linden Labs., Inc. State College, Pa.
MACHINING HIGH PURITY ALUMINA.
Quarterly rept. no. 8, 31 Mar-30 Jun 66. 30 Jul 66, 12p
Contract DA-36-039-AMC-03634 (E)
See also AD-637 021.

Descriptors: (*Machining, *Ceramic materials), (*Aluminum compounds, Oxides), Dielectric properties, Mechanical properties, Fluorination.

The results of measurements of the properties of the 96% alumina bodies indicate that it is possible to fluorinate, machine and reconstitute a body of this composition and retain useful mechanical and dielectric properties. (Author)

AD-640 852 **Field 13H**
CFSTI Prices: HC$4.00 MF$1.00
General Electric Co., Auburn, N. Y. Semiconductor Products Dept.
QUALITY CONTROL MANUAL.
10 Oct 66, 140p
Contract DA-36-039-AMC-06157 (E)

Descriptors: (*Quality control, *Semiconductor devices), Instruction manuals, Semiconductors, Industrial production.

The manual was compiled to describe the Quality Control procedures currently in effect within the Semiconductor Products Department of the General Electric Company. It should be recognized that the procedures and practices contained herein may be changed, amended or deleted as dictated by the policy of the Semiconductor Products Department, which is to offer the highest quality product commensurate with the current state of the semiconductor art. The Quality Plan for the production line producing for this contract has been provided in addition to this document as specified in the contract. (4JA14 Quality Plan). (Author)

AD-641 257 **Field 13H**
CFSTI Prices: HC$6.00 MF$1.25
California Univ., Berkeley. Dept. of Mechanical Engineering.
ANALYTICAL PREDICTION OF DEFECTS FOR EXTRUSION THROUGH CONICAL DIES OF VARYING REDUCTIONS AND DIE ANGLES.
Progress rept.,
by Taylan Altan, and Shiro Kobayashi. Jul 66, 23
Contract AF 33 (615)-3283

Descriptors: (*Extrusion, Mechanics), Dies, Conical bodies, Defects (Materials), Mathematical prediction, Programming (Compu

ters), Numerical methods and procedures, Temperature, Theorems, Numerical analysis, Plasticity.

The principal aim during the first year of investigation was to develop a theoretical method of analysis for obtaining the detailed mechanics of the extrusion process, with special reference to extrusion through conical dies. The visioplasticity and upper-bound methods were summarized, and the method of calculating temperature distributions was reviewed. Extended treatment of admissible velocity fields was then made, and a numerical method was developed for predicting the non-steady-state temperature distributions. A computer program of the entire procedure was completed for general use. (Author)

AD-641 284 **Field 13H, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
AGING OF BERYLLIUM-CHROMIUM AND BERYLLIUM-ZIRCONIUM ALLOYS,
by I. G. Dyakov, I. I. Papirov, and G. F. Tikhinskii. 25 Aug 66, 7p ATD-66-104
TT-66-62540
Trans. of Fizika Metallov i Metallovedenie (USSR) v21 n5 p785-6 1966. Translations of Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Beryllium alloys, *Aging (Materials)), Chromium alloys, Zirconium alloys, USSR, Chemical precipitation, Impurities.

The work presents the results of research on the processed aging in beryllium alloys containing 0.3% Cr or 0.3% Zr, prepared from distilled beryllium (99.95%) and electrolytic chromium (99.7%) or iodide zirconium (99.9%). An analysis of these results confirms the conclusion reached earlier that almost complete precipitation of Cr from the matrix occurs during aging. In the case of Be-Zr alloy zirconium apparently not only completely precipitates from the matrix, but also promotes precipitation of other impurities. (Author)

N66-30489 **Field 13H**
CFSTI Prices HC$5.00 MF$1.00
Hughes Research Labs., Malibu, Calif.
ALLOY IONIZER FABRICATION SUMMARY REPORT.
by W. E. Mc kee, and R. R. Turk. May 66, 176p NASA-CR-54677, HRL-6272S
Contract NAS3-6272

Descriptors: *Iridium, *Manufacturing, *Porous material, *Refractory alloy, *Rhenium, *Tungsten, Alloy, Coating, Fabrication, Ionization, Method, Porosity, Powder, Refraction, Sphere.

For abstract, see STAR 04 17.

N66-30855 **Field 13H**
CFSTI Prices HC$3.00 MF$0.75
Automation Industries, Inc., Danbury, Conn. Engineering Dept.
DEVELOPMENT OF A RING BEAM WHEEL SURFACE WAVE SEARCH UNIT FINAL REPORT.
by A. M. Murdoch. 11 Apr 66, 85p NASA-CR-76361
Contract NAS8-11454

Descriptors: *Flaw detection, *Inspection, *Nondestructive testing, *Surface wave, *Ultrasonic testing, Beam, Crack, Defect, Detection, Flaw, Nondestructive, Ring, Surface, Testing, Transducer, Ultrasonic, Wave, Wheel.

For abstract, see STAR 04 17.

N66-30857 **Field 13H**
CFSTI Prices HC$6.00 MF$1.25
Goodyear Aerospace Corp., Akron, Ohio.
DEVELOPMENT OF A LIGHTWEIGHT CRYOGENIC INSULATING SYSTEM FINAL REPORT, 30 JUN. 1964 - 31 MAY 1966.
by J. N. Apisa, R. A. Burkely, A. H. Kariotis, P. Kost, and S. R. Rollins. May 66, 240p NASA-CR-76368, GER-12269
Contract NAS8-11761

Descriptors: *Cryogenic storage, *Insulation, *Propellant tank, *Thermal protection, Calorimeter, Cryogenic, Design, External, Hydrogen, Launch vehicle, Lightweight, Liquid, Material, Mechanical, Panel, Propellant, Property, Protection, Storage, Tank, Test, Thermal, Vibration.

For abstract, see STAR 04 17.

N66-30858 **Field 13H**
CFSTI Prices HC$4.00 MF$1.00
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile And Space Systems Div.
MECHANISMS OF POROSITY FORMATION IN ALUMINUM WELDS.
by W. V. Mixon, D. D. Pollock, and W. W. Reinhardt. Jun 66, 130p NASA-CR-76369, SM-52039
Contract NAS8-11332

Descriptors: *Aluminum alloy, *Porosity, *Welding, Absorption, Alloy, Aluminum, Formation, Growth, Hydrogen, Mechanism, Plate, Vapor, Water.

For abstract, see STAR 04 17.

N66-31872 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
India. Dept. Of Atomic Energy, Bombay.
DEVELOPMENT OF U-FOAM AIR FILTERS.
by R. V. Amalraj, A. A. Khan, and K. T. Thomas. 1966, 30p AEET-244

Descriptors: *Air filter, *Foamed material, Air, Chemical, Cost, Efficiency, Filter, Filtration, Foam, Material, Mechanical, Property, Resistance, Strength, System, Temperature, U bend, Ventilation.

For abstract, see STAR 04 17.

N66-31904 **Field 13H**
CFSTI Prices HC$3.00 MF$0.75
Hittman Associates, Inc., Baltimore, Md.
THERMOELECTRIC BONDING STUDY, PHASE II SUMMARY REPORT.
by A. L. Eiss. Apr 66, 107p NASA-CR-76512, HIT-205
Contract NAS5-3973

Descriptors: *Bonding, *Lead telluride, *Thermoelectric material, Effect, Fabrication, Lead, Life, Material, Strength, Stress, Telluride, Testing, Thermoelectric.

For abstract, see STAR 04 17.

N66-32136 **Field 13H**
CFSTI Prices HC$2.50 MF$0.50
Electro-optical Systems, Inc., Pasadena, Calif.
DEVELOPMENT OF AN ELECTRODEPOSITION PROCESS FOR THE FABRICATION OF A SPHERICAL CRYOGENIC FLUID STORAGE CONTAINER.
by R. N. Hanson. 30 Jun 66, 55p NASA-CR-76640, EOS-6951-FINAL
Contract NAS8-20094

Descriptors: *Cryogenic storage, *Electrodeposition, *Spherical tank, *Storage device, Cryogenic, Device, Electroforming, Helium, Hydrostatic, Mandrel, Spherical, Storage.

For abstract, see STAR 04 17.

N66-32297 **Field 13H**
CFSTI Prices HC$1.00 MF$0.50
Boeing Co., Seattle, Wash.
IDENTIFYING OPTIMUM PARAMETERS OF HOT EXTRUSIONS PROGRESS REPORT NO. 9, 1 MAY - 15 JUL. 1966.
1966, 13p NASA-CR-76742
Contract NAS7-276

Descriptors: *Extrusion, *Fracture, *Magnesium oxide, Analysis, Bicrystal, Boundary, Cleavage, Failure, Furnace, Grain, Hot extrusion, Magnesium, Oxide, Surface, Tensile.

For abstract, see STAR 04 17.

N66-32434 **Field 13H**
CFSTI Prices HC$2.50 MF$0.50
Reynolds Metals Co., Richmond, Va. Finishing And Composites Section.
A SPRAY OR BRUSH ANODIZING PROCESS FOR ALUMINUM ALLOYS SIX-MONTH PROGRESS REPORT.
by H. J. Coates. 20 Jun 66, 58p NASA-CR-76758, MRD-35-170-820
Contract NAS8-20157

Descriptors: *Aluminum alloy, *Anode, *Sprayed protective coating, Alloy, Aluminum, Anodization, Brush, Coating, Electrolyte, Feasibility, Flow, Material, Process, Protection, Treatment.

For abstract, see STAR 04 17.

N66-32683 **Field 13H**
CFSTI Prices HC$1.00 MF$0.50
Harvey Aluminum, Torrance, Calif. Engineering Labs.
DEVELOPMENT OF CONTROLS FOR TIME-TEMPERATURE CHARACTERISTICS IN ALUMINUM WELDMENTS PROGRESS REPORT NO. 9, 1-31 DEC. 1965.
by D. Q. Cole. 10 Jan 66, 24p NASA-CR-76910, HA-2209
Contract NAS8-11930

Descriptors: *Aluminum, *Porosity, *Tensile strength, *Tooling, *Welding, Carbon, Characteristics, Chill, Control, Dioxide, Grain, Heat, Liquid, Process, Size, Strength, Temperature, Tensile, Time, X-ray, Zone.

For abstract, see STAR 04 17.

N66-37144 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
Westinghouse Electric Corp., Baltimore, Md.
SUPERIOR PHOTOENGRAVING PROCESS FOR SEMICONDUCTOR DEVICES.
by C. J. Taylor. Sep 66, 39p NASA-CR-597
Contract NAS5-2755

Descriptors: *Photoengraving, *Semiconductor device, Adhesion, Coating, Device, Etching, Oxide, Resistance, Semiconductor, Silicon, Surface, Wafer.

For abstract, see STAR 04 22.

N66-37273 **Field 13H**
CFSTI Prices HC$3.75 MF$1.50
Aerojet-general Corp., Sacramento, Calif.
FEASIBILITY STUDY OF ACOUSTIC DEPRESSURIZATION SYSTEM FINAL REPORT, 15 JUL. 1964 - 25 FEB. 1966.
by S. J. Brown, A. T. Green, C. S. Lockman, and R. K. Steele. Mar 66, 256p NASA-CR-55472
Contract NAS7-310

Descriptors: *Accident prevention, *Pressurization, *Rocket motor case, Accident, Acoustic, Case, Depressurization, Destruction, Feasibility, Flaw, Motor, Pressure, Prevention, Proof, Rocket, System, Test.

For abstract, see STAR 04 22.

PB-173 375 Field 13H, 11C, 5C
CFSTI rices: HC$2.00 MF$0.50
Squires (C. K.), Stockholm (Sweden).
CORROSION PROTECTION METHODS AND MATERIALS IN SWEDEN.
Oct 64, 45p

Descriptors: (*Corrosion inhibition, Sweden), (*Coatings, Corrosion inhibition), Industrial production, Commerce, Cathodic protection.

Sweden is largely self-supplying regarding coating paints - this industry having been developed strongly during war isolation years. It has an estimated total market at wholesale value of around $62 million, with total import at $8 million of which the US share is under $1 million. The main suppliers are Germany, Holland and the UK. The US influence is nevertheless strong and is regarded as a main source of inspiration for development, many US manufacturers having made licence deals and others built local production facilities. The oil companies and specialist firms like Rustoleum, are active in the specialist rust-prevention field. There is keen competition throughout the field, but it is efficacy, rather than price, which is in most cases the dominant factor.

AD-453 087 See Field 17B

AD-458 873 See Field 17B

AD-640 643 See Field 20B

AD-640 710 See Field 9E

AD-640 711 See Field 9A

AD-640 723 See Field 11G

AD-640 894 See Field 9A

AD-640 961 See Field 20B

AD-641 025 See Field 14B

AD-641 026 See Field 14B

AD-641 177 See Field 11C

AD-641 262 See Field 11F

AD-64 277 See Field 20L

N66-31920 See Field 7A

13I. MACHINERY AND TOOLS

AD-640 851 Field 13I
CFSTI Prices: HC$1.00 MF$0.50
Franklin Inst. Research Labs., Philadelphia, Pa.
AN ANALYSIS OF EXPERIMENTAL DATA ON ENTRANCE EFFECTS IN CIRCULAR THRUST BEARINGS.
Interim technical rept.,
by S. P. Carfagno. Sep 66, 25p I-A2049-28
Contract Nonr-2342 (00)
Proj. NR-062-316

Descriptors: (*Thrust bearings, *Gas bearings), Gas flow, Loading (Mechanics), Design, Configuration.

An empirical method is presented for taking entrance effects into account in computing flow rates and load-carrying capacities of circular thrust bearings. Because of the limited data on which it is based, the method is applicable only to bearings having an 0.020-in. diameter supply hole; but it can be generalized when data for other supply hole diameters are obtained. When applied to the geometry for which experimental data were available, the procedure yielded values of flow rate and load falling within approximately 10 per cent of the experimental values. (Author)

AD-641 189 Field 13I, 11H
CFSTI Prices: HC$4.00 MF$0.75
SKF Industries, Inc., King of Prussia, Pa. Research Lab.
ROLLING CONTACT FAILURE CONTROL THROUGH LUBRICATION.
Special research rept.,
by T. E. Tallian. 19 Sep 66, 118p SKF-AL66Q028
Contracts Nonr-4433 (00), NOw-64-0428
Supported by Contracts Nonr-4895 (00), NOw-65-0182, NOw-66-0225, and NOw-66-0284.

Descriptors: (*Roller bearings, Failure (Mechanics)), (*Lubrication, Roller bearings), Friction.

The paper is subdivided into the following sections: (1) Description of typical rolling contact failure modes, (2) Review of parameters influential in causing contact failure, (3) Observations on rolling contacts which relate failure mechanism to engineering parameters of the contact, and specifically to lubrication.

N66-31220 Field 13I
CFSTI Prices HC$3.00 MF$0.50
Pratt And Whitney Aircraft, East Hartford, Conn.
BRAYTON-CYCLE TURBOMACHINERY ROLLING-ELEMENT BEARING SYSTEM THIRD QUARTERLY REPORT, JAN. 2 - APR. 2, 1966.
by H. Means. May 66, 59p NASA-CR-54991, PWA-2845
Contract NAS3-7635

Descriptors: *Brayton cycle, *Gas bearing, *Roller bearing, *Turboalternator, Bearing, Compressor, Coolant, Design, Gas, Lubrication, Oil, Power, Pump, Roller, Rotor, Seal, Separator, Space, Support, Turbine.

For abstract, see STAR 04 17.

N66-37524 Field 13I
CFSTI Prices HC$3.00 MF$0.75
North American Aviation, Inc., Columbus, Ohio.
TEST AND EVALUATION OF ARTICULATING JAW ASSEMBLIES FINAL REPORT.
by H. R. Green. 2 Sep 66, 79p NASA-CR-78323
Contract NAS8-20271

Descriptors: *Aerospace technology, *Sheet metal, *Stretch forming, *Test method, Component, Metal, Metallurgy, Missile, Pressing, Program, Rocket, Space, Working.

For abstract, see STAR 04 22.

AD-640 764 See Field 20D

AD-641 082 See Field 20D

NAA-SR-11943 See Field 9B

UCRL-14944 See Field 14B

13J. MARINE ENGINEERING

AD-640 539 Field 13J
CFSTI Price: MF$4.50
Office of Naval Research, Washington, D. C.
SYMPOSIUM ON NAVAL HYDRODYNAMICS SHIP MOTIONS AND DRAG REDUCTION (5TH), SEPTEMBER 10-12, 1964, BERGEN, NORWAY.
12 Sep 64, 1154p ACR-112
Availability: Hard copy available from Suprintendent of Documents, GPO, Washington, D. C. 20402 $7.25

Descriptors: (*Ships, Hydrodynamics), Motion, Drag, Reduction, Symposia, Norway.

AD-640 707 Field 13J, 11I
CFSTI Prices: HC$3.00 MF$0.50
Allied Research Associates, Inc., Concord, Mass.
AN EXPERIMENTAL INVESTIGATION OF DEEP SUBMERGENCE WINDOWS.
Final technical rept.,
by Robert Winter. 10 Oct 66, 58p ARA-315-10
Contract NObs-94102
Proj. SF013-03-02
Task 1963
See also AD-634 403.

Descriptors: (*Submarine hulls, Deep submergence), (*Acrylic resins, Submarine hulls), Creep, High-pressure research, Loading (Mechanics).

An experimental study was conducted on 90 degree conical plexiglas deep submergence window models in the range of small diameter/thickness ratio of 0.5 to 2.5. Several windows were tested under short term high pressure loadings, one was subjected to a 30 day creep test, and some models were fully submerged under high hydrostatic pressures. There were preliminary indications that improved structural performances could be obtained by recessing the model in its seat at the inner face, and that the strength of the windows may be affected by rapid loading or unloading rates. Small elastic creep deformations were found at 2,000 psig over 30 days for d/h = 1.0. The very high hydrostatic pressures had no observable effect on the windows. (Author)

AD-640 979 Field 13J
CFSTI Prices: HC$5.00 MF$1.00
Science Engineering Associates, Inc., San Marino, Calif.
AN ENGINEERING AND ECONOMIC EVALUATION OF FLOATING FENDER CONCEPTS.
Final rept.,
by Bertram J. Thorn. Jun 66, 152p
Contract NBy-62205
Proj. Y-F015-10-03-315
NCEL-CR-66.008

Descriptors: (*Piers, Naval shore establishments), Floats, Costs, Marine engineering, Design, Ships, Loading (Mechanics), Ship hulls, Mooring.

Identifiers: Fenders (Marine equipment).

The report contains an engineering and economical evaluation of eight different concepts of floating fenders to be considered for Navy docks. The engineering aspects involve discussion of different design criteria, such as vessel approach velocities, acceptable lateral dock loads, hull loads and stresses in structural timber. A description of the dynamics of a berthing ship is given, including a discussion of the various energy correction coefficients to be used. The hydrodynamic mass coefficient is especially emphasized. The results obtained on this coefficient by many different investigators are summarized, showing that large unexplained discrepancies exist. The economic criteria employed are stated and summarized. A short discussion on deterioration of camel materials is also included. Due to inadequate data on maintenance costs, these calculations had to rely mostly on engineering judgement and intuition. Fairly detailed engineering descriptions and calculations as well as economic evaluation of every concept is included. Conclusion and recommendations based on the study are given as well as a preliminary final design. (Author)

AD-641 119 Field 13J, 13F
CFSTI Prices: HC$2.00 MF$0.50
Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
DRAG STUDIES OF COUPLED AMPHIBIANS.
Final rept.,
by R. L. Van Dyck, and I. R. Ehrlich. Jul 66, 42p
Rept. no. 1137
Contract Nonr-263 (59)
Proj. DL-2907/067

Descriptors: (*Amphibious vehicles, *Drag), Hulls (Marine), Design, Towed vehicles, Configuration.

Identifiers: LVTP-5 amphibious vehicles.

The report describes tests conducted to obtain the hydrodynamic drag characteristics of coupled models of the LVTP-5. Problems of swamping and broaching were also studied, and are discussed. It was found that the total resistance of a train of five vehicles is less than twice the resistance of a single vehicle. If propulsive efficiency is unaffected by coupling, this represents a potential speed gain of almost 50 percent. (Author)

AD-640 986 See Field 13M

AD-640 986 See Field 13M

AD-641 015 See Field 21E

AD-641 262 See Field 11F

AD-75348 See Field 17B

AD-78 536 See Field 17B

AD-95 052 See Field 17B

13K. PUMPS, FILTERS, PIPES, FITTINGS, TUBING, AND VALVES

N66-31893 **Field 13K**
CFSTI Prices HC$2.50 MF$0.75
Iit Research Inst., Chicago, Ill.
INVESTIGATION OF THE EXPLOSION HAZARD OF CONTAMINATED DIFFUSION PUMP FLUIDS FINAL REPORT, 1 JUL. 1965 - 1 JUN. 1966.
by J. Farrell. 1966, 87p NASA-CR-76525
Contract NAS5-9632

Descriptors: *Chemical energy, *Contamination, *Pump, Aluminum, Calcium, Chemical, Diffusion, Energy, Fluid, Hazard, Magnesium, Ozone, Potential, Reaction, Release, Simulation, Space, Vacuum.

For abstract, see STAR 04 17.

N66-32638 **Field 13K**
CFSTI Prices HC$2.50 MF$0.75
Pratt And Whitney Aircraft, West Palm Beach, Fla. Research And Development Center.
INVESTIGATION OF PRESSURE PREDICATION METHODS FOR LOW FLOW RADIAL IMPELLERS FINAL REPORT.
by H. F. Due, and W. E. Young. 4 Feb 66, 78p
NASA-CR-76947, PWA-FR-1716
Contract NAS8-5442

Descriptors: *Computer program, *Pressure distribution, *Pump impeller, *Radial flow, Blade, Centrifugal, Computer, Disk, Distribution, Equation, Face, Flow, Fortran, Housing, Impeller, Incompressible, Low, Prediction, Pressure, Program, Pump, Regression, Smoothness, Testing.

For abstract, see STAR 04 17.

PB-173 345 **Field 13K**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Hydraulic Machinery Branch.
MATHEMATICAL DETERMINATION OF LEAKAGE PAST TURBINE AND PUMP WEARING RINGS AND PROCEDURE FOR DESIGNING SERRATED RINGS.
Jul 66, 29p HM-5

Descriptors: (*Hydraulic pressure pumps, Leakage (Fluid)), (*Leakage (Fluid), Mathematical prediction), (*Metal seals, Design), Turbines, Pumps, Maintenance, Hydraulic seals, Impellers, Orifices.

Identifiers: Turbine efficiency.

Clearance between stationary and rotating parts of turbines and pumps is necessary to prevent metal-to-metal contact with resulting possible seizure. This clearance is usually provided by replaceable wearing rings located between the high- and low-pressure areas outside the water passages. Clearance will increase due to wear, causing more leakage through the rings. Since this increase in leakage represents a decrease in efficiency and capacity, there comes a time when it will be economical to restore the original clearance. Economics of the restoration work may hinge on a small decrease in efficiency and capacity. Results of index testing have not proven sufficiently reliable or consistently accurate to detect such small quantities. A mathematical approach is outlined by which increase in leakage through the rings of turbines or pumps may be determined. A curve is shown which relates ring clearance and width to differential head and leakage per foot of ring diameter for plain rings. The mathematical approach, being more reliable and consistent than index testing, provides a means of determining clearance at which restoration work will be economically feasible. Tests at Tracy Pumping Plant verify computed results showing a reduction of 10 to 15% in leakage through a given ring clearance with serrated rings in place of plain rings. Includes a procedure for designing serrated rings. (Author)

13L. SAFETY ENGINEERING

AD-640 543 **Field 13L, 15C**
CFSTI Prices: HC$6.00 MF$1.25
System Development Corp., Santa Monica, Calif.
SYMPOSIUM ON EMERGENCY OPERATIONS.
Professional paper,
by Robert C. Brictson. 1 Sep 66, 229p SP-2579

Descriptors: (*Disasters, Symposia), Civil defense systems, Control, Law, Snow, Fire safety, Nuclear warfare, Chemical warfare, Biological warfare, Hazards, Earthquakes, Manpower studies, Management planning, Labor, Training, Storms, Public health, Communication systems, Warning systems.

The symposium participants discussed emergencies ranging from heavy snowfall to nuclear war. The attendees ranged from professionals in research and academic institutions to operational organizations: from local to national government officials; and from emergency specialists to planners of large-scale civil defense preparations. The focus in practical areas was on police, fire and medical activities as demonstrations of emergency services. Civil defense was a frequent topic in discussions. The interaction of researchers with practitioners responsible for local administration and operation was of value because theoretical concepts could be measured against practical experience and actual occurrences.

AD-640 595 See Field 6U

N66-37587 See Field 18I

13M. STRUCTURAL ENGINEERING

AD-640 557 **Field 13M, 20K**
CFSTI Prices: HC$8.60 MF$0.75
General Technology Corp., Torrance, Calif.
STRESSES IN PRESSURIZED CYLINDRICAL SHELL WITH CIRCULAR CUTOUT.
Technical rept.,
by L. V. Kline, R. C. Dixon, N. F. Jordon, and A. C. Eringen. Aug 61, 87p TR-3-1
Contract NObs-78866
See also AD-640 558.

Descriptors: (*Structural shells, Stresses), Cylindrical bodies, Perturbation theory, Pressure.

By use of a perturbation technique, the deflections and stresses in a circular cylindrical shell with a circular cutout, subject to internal pressure are determined. A computational procedure is set up to determine the stress concentration at the edge of the hole and the stresses existing at any point in the shell. In article 2 are given the general outline of the theoretical analysis, the pertinent conclusions reached, and the results of a sample calculation. The remainder of the report is devoted to the details of the theoretical work and of the sample calculation. (Author)

AD-640 558 **Field 13M, 20K**
CFSTI Prices: HC$5.60 MF$0.75
General Technology Corp., Torrance, Calif.
STRESS ANALYSIS OF A CIRCULAR CYLINDRICAL SHELL WITH CIRCULAR CUTOUT.
Technical rept.,
by A. K. Naghdi, and A. C. Eringen. Jan 63, 58p TR-3-2
Contract NObs-78866
See also AD-640 557.

Descriptors: (*Structural shells, Stresses), Cylindrical bodies, Differential equations, Pressure, Bending, Boundary value problems.

A class of problems concerned with the determination of the stress field in a circular cylindrical shell with a circular cutout is investigated. Specifically, the following three cases are treated: (a) the shell subjected to a uniformly distributed bending moment around the cutout; (b) the shell subjected to a uniform axial tensile load with a stress-free cutout; and (c) an internally pressurized shell with a uniform transverse shear at the edge of the cutout. By superposition of the results for these cases one may obtain the solution of several other technically important problems. The method employs the exact solution of the Donnel theory of thin shells satisfying the boundary conditions at the circular cutout in a collocation sense. The accuracy and the domain of applicability of the method is demonstrated and discussed. A forthcoming report will present extensive computer calculations for these cases. (Author)

AD-640 559 **Field 13M, 20K**
CFSTI Prices: HC$19.20 MF$1.25
General Technology Corp., Torrance, Calif.
COMPUTATIONS FOR STRESS AND STRESS CONCENTRATION IN A CIRCULAR CYLINDRICAL SHELL WITH CIRCULAR CUTOUT.
Technical rept.,
by S. L. Koh, C. C. Thiel, and A. C. Eringen. Apr 63, 196p TR-3-3
Contract NObs-78866

Descriptors: (*Structural shells, Stresses), Cylindrical bodies, Pressure, Bending, Tables, Boundary value problems.

In a recent report by Naghdi and Eringen (G.T.C. Technical Report No. 3-2, 'Stress Analysis of a Circular Cylindrical Shell with Circular Cutout,' January 1963) (AD-640 558), a theoretical analysis of an infinitely long circular cylindrical shell with a circular cutout is presented. Specific results are obtained for three particular cases in which the shell is subjected to: Case I. A uniformly distributed bending moment around the edge of the cutout. (Pending Moment Case) Case II. A uniform longitudinal tensile load with the edge of the cutout stress-free. (Extension Case) Case III. A uniform internal pressure with a uniform transverse shear at the edge of the cutout. (Internal Pressure Case) The analytical results of the cited Technical Report 3-2 are used in the detailed calculations undertaken for the present report. The state of stress for each of the three cases above is determined for a variety of cylindrical shells having different material and geometry properties. Stress concentration factors are also calculated for Cases II and III. The present report includes a summary of significant results presented in Technical Report 3-2. To avoid excessive duplication, only pertinent expressions are repeated here, except those which are too lengthy to reproduce. Therefore, for these long expressions, reference has to be made to Technical Report 3-2. In addition there is presented a discussion on stress con-

centration for a combined state of stress not included in Technical Report 3-2. The calculated numerical results are presented and discussed for each of the three cases described above. The application of these data are indicated.

AD-640 560 **Field 13M, 20K**
CFSTI Prices: HC$4.60 MF$0.50
General Technology Corp., Torrance, Calif.
STRESS CONCENTRATION IN A CAPPED CIRCULAR CYLINDRICAL SHELL WITH CIRCULAR CUTOUT.
Technical rept.,
by C. C. Thiel, and A. C. Eringen. Jun 63, 44p TR-3-4
Contract NObs-78866
See also AD-640 559.

Descriptors: (*Structural shells, Stresses), Cylindrical bodies, Pressure, Bending, Strain (Mechanics).

The purpose of this report is twofold: (1) To determine stress concentration factors associated with a capped infinite circular cylinder with a circular cutout under internal pressure loading and a constant shear distributed on the edge of the cutout. (See Section IV) This corresponds to a cylindrical pressure vessel with an inlet. (2) To investigate the effect of Poisson's ratio on the stress concentration factor in each of the three cases: (Case I) A uniformly distributed bending moment around the edge of the cutout (Bending Moment Case) (Case II) A uniform longitudinal tensile load with the edge of the cutout stress-free (Extension Case) (Case III) A uniform internal pressure with a uniform transverse shear at the edge of the cutout (Internal Pressure Case). The interest in studying the Poisson ratio effect is motivated by the fact that the two experimental techniques of stress determination, namely resistance strain gauge measurements on steels and photoelastic measurements on plastics, make use of test materials of very different Poisson's ratio, namely nu = 0.30 and nu = 0.49 respectively. In both experimental and practical application, the greatest interest lies in cylindrical pressure vessels.

AD-640 859 **Field 13M**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., San Diego, La Jolla. Dept. of the Aerospace and Mechanical Engineering Sciences.
OPTIMUM PLASTIC DESIGN OF A PORTAL FRAME FOR ALTERNATIVE LOADS.
Technical rept.,
by William Prager. Oct 66, 14p TR-2
Contract N00014-67-A-0109-0003
Proj. NR-064 496

Descriptors: (*Structures, Loading (Mechanics)), Design, Plasticity, Weight.

Minimum-weight design of a portal frame for alternative combinations of horizontal and vertical loads is discussed. It is shown that the usual proof of the existence of a Foulkes mechanism as a necessary condition for minimum weight cannot be carried over to this problem. (Author)

AD-640 900 **Field 13M, 20K**
Not available from CFSTI.
Army Materials Research Agency, Watertown, Mass.
COMMENT ON 'COMPUTER ANALYSIS OF ASYMMETRIC FREE VIBRATIONS OF RING-STIFFENED ORTHOTROPIC SHELLS OF REVOLUTION'.
Technical rept.,
by Edward W. Ross Jr. 23 Feb 66, 11p AMRA-TR-66-30
Proj. DA-1P014501B33A
Availability: Published in AIAA Journal v4 n7 Jul 1966.

Descriptors: (*Structural shells, Vibration), Spheres, Elasticity, Mathematical analysis, Differential equations, Theory, Corrections.

In the axisymmetric vibration of spherical domes membrane theory predicts, for certain edge conditions, the occurrence of 'breathing' frequencies and modes. In this note asymptotic theory is used to obtain the corrections to these frequencies and modes due to bending effects. The mode corrections are quite large although the frequency corrections are moderate. (Author)

AD-640 974 **Field 13M, 13C, 8L**
CFSTI Prices: HC$3.00 MF$0.75
Cold Regions Research and Engineering Lab., Hanover, N. H.
EFFECT OF EXPLOSIONS ON SNOW STRUCTURES.
Technical rept.,
by Henryk Szostak, and Robert Benert. Apr 66, 64p TR-92
Task DA-IV025001A13001

Descriptors: (*Snow, *Structures), (*Explosion effects, Snow), TNT, Feasibility studies, Construction, Arctic regions.

During the summer of 1960, tests were conducted on the Greenland Ice Cap to study the resistance and behavior of snow structures to dynamic loading from a surface or above-surface air blast of 4 or 32 lb. spherical cast TNT. A number of small- and full-scale vertical and full-size horizontal arches were constructed in processed snow pads. Arch spans and arch crown thickness were varied to establish a relation between surface overpressure and the ratio of arch span (S) to arch crown thickness (T). Some correlation was found for vertical structures but none between vertical and horizontal arches. The results show that, for the same charge weight and S/T ratio, the horizontal structures can withstand over 100 psi overpressure, while smale-scale vertical arches fail at 20 psi. (Author)

AD-640 986 **Field 13M, 1C, 13J, 13J K**
CFSTI Prices: HC$2.00 MF$0.50
Allied Research Associates, Inc., Concord, Mass.
STRUCTURAL GUIDELINES FOR MATERIALS DEVELOPMENT. PART I. SOME VEHICLE PERFORMANCE AND DESIGN GENERALIZATIONS.
Final rept., 23 Jun 65-22 Oct 66,
by George Gerard. Oct 66, 27p ARA-304-6-PF-1
Contract NOw-65-0595
See also AD-640 992.

Descriptors: (*Vehicles, Materials), (*Aircraft, Design), (*Ships, Design), Performance (Engineering), Propulsion, Submarines, Structures.

Starting with the generalization that the function of a vehicle is to efficiently transport a given payload a given distance, the structural weight fraction has been identified as the factor most sensitive to structures and materials improvement. Furthermore, the value of structural weight saving over the life of the vehicle can be large and thus relatively large costs can be expended in such endeavors. Analysis of the factors comprising the structural weight fraction has lead to the important generalization that the structural design of the vehicle or its major components are characterized by rather narrow ranges of the maximum design index. It is this factor which dictates the specific improvements in materials (or structures) that can result in a meaningful reduction of the structural weight fraction. (Author)

AD-640 992 **Field 13M, 11F, 11B**
CFSTI Prices: HC$3.00 MF$0.50
Allied Research Associates, Inc., Concord, Mass.
STRUCTURAL GUIDELINES FOR MATERIALS DEVELOPMENT. PART II. MECHANICAL PROPERTIES AND EFFICIENCY PARAMETERS FOR SHEET MATERIALS.
Final rept.,
by P. E. Kyle. Oct 66, 53p ARA-304-6-Pt-2
Contract NOw-65-0595
See also AD-640 986.

Descriptors: (*Vehicles, Materials), (*Sheets, Mechanical properties), Steel, Heat-resistant metals + alloys, Catalogs, Structural properties, Structures.

A catalog is given of materials properties and efficiency parameters for light alloys, high strength steels and heat resisting alloys. (Author)

AD-641 162 **Field 13M**
CFSTI Prices: HC$3.00 MF$0.75
Illinois Univ., Urbana. Dept. of Civil Engineering.
ANALYSIS OF SHALLOW DOUBLY-CURVED SHELLS SUPPORTED BY ELASTIC EDGE MEMBERS,
by J. A. Padilla, and W. C. Schnobrich. Jun 66, 65p Structural Research Ser-310
Contract Nonr-1834 (03)
Proj. NR-064-183

Descriptors: (*Structural shells, Structural properties), Curved profiles, Bending, Supports, Beams (Structural), Differential equations, Mathematical analysis, Numerical methods and procedures, Boundary value problems.

The study is concerned with the bending analysis of doubly-curved shallow shells with rectangular planform. The equations of the theory of shallow shells developed by Vlassov are used. The assumptions made for the shell are the same as in Vlassov. The present study starts from the formulation of the governing equations expressed in terms of the displacements, u, v, w. These three differential equations specialized to shallow shells are expressed in finite differences, using the modified finite-difference method. All quantities represented by odd order derivatives of the unknown displacement components are defined at points midway between those used in defining the even order derivatives. The axial, bending and torsional stiffnesses of the curved beams at the boundaries are taken into account. The parameters appearing in the equations and corresponding to each of these stiffnesses allow simulation of any type of boundary condition at any of the four edges, either realistic, according to the dimensions of the curved beams, or idealized according to assumed stiffnesses for the supporting members. (Author)

PB-173 216 **Field 13M, 20K**
CFSTI Prices: HC$8.50 MF$2.50
Illinois Univ., Urbana. Dept. of Civil Engineering.
A YIELD CRITERION FOR REINFORCED CONCRETE UNDER BIAXIAL MOMENTS AND FORCES,
by Rolf J. Lenschow, and Mete A. Sozen. Jul 66, 551p Structural Research Ser-311
Grant NSF-GK-171

Descriptors: (*Reinforced concrete, Structural properties), (*Structural properties, Failure (Mechanics)), Yield point, Fatigue (Mechanics), Force (Mechanics), Stresses, Torsion, Load distribution, Buckling (Mechanics), Bending, Moments, Flexural strength, Reinforcing materials.

The over-all objective of this study was to develop a general yield criterion for reinforced concrete plates subjected to combinations of bending and twisting moments. The work included tests on slab elements and theoretical studies leading to the definition of a general yield criterion. In addition to the analysis of the conditions at yield, detailed studies were made of the load-deformation characteristics of reinforced concrete elements subjected to combinations of bending and twisting moments. The results of these studies are applicable to problems concerning reinforcement for membrane forces as well as bending moments. The theoretical and experimental work confirmed the applicability of Johansen's criterion under practical conditions, provided the principal moments are of equal sign. The test results showed that the effect on flexural

strength of the reorientation of reinforcing bars at the yield lines was negligible. (Author)

PB-173 271 **Field 13M, 11B**
CFSTI Prices: HC$5.00 MF$1.00
Louisiana Polytechnic Inst., Ruston. Dept. of Engineering Research.
AN INVESTIGATION OF STRESSES IN PHOTOELASTIC MODELS OF PRESTRESSED CONCRETE BEAMS BY THE FROZEN STRESS METHOD,
by J. H. Barnwell, and C. H. Edwards Jr. 1965, 164p Rept. no. 0300
Proj. 736-00-27
Prepared in cooperation with Louisiana Dept. of Highways and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Beams (Structural), *Stresses), (*Concrete, Beams (Structural)), Models (Simulations), Photoelasticity, Nylon, Epoxy plastics, Loading (Mechanics).

The report presents the results of an investigation into the nature of end-zone stress distribution in prestressed photoelastic models using the frozen stress technique. Only loading due to prestressing was considered. The photoelastic model material used was an epoxy resin, while the tendon material used was hard-twisted nylon cord. A three-dimensional photoelastic analysis was made of each of three types of prestressed beam models, as follows: (1) A simplified beam model, rectangular crossection, containing one central pretensioned tendon. (2) Same model as in 1, but containing two tendons. (3) A scale model of a Type II AASHO beam. The analyses were confined to the highly stressed regions near the ends of the beams. Significant results from the study were: (1) The development of a technique for forming a three-dimensional photoelastic model which could simulate a prestressed concrete beam. (2) The determination of the existence of relatively high transverse tensile stresses between the groups of tendons near the ends of the beams. (3) A graphic presentation of the relative magnitude of the stresses throughout the highly stressed regions near the ends of the beams. (Author)

PB-173 280 **Field 13M**
CFSTI Prices: HC$2.00 MF$0.50
Oregon State Highway Dept.
A STUDY OF SPLIT TUBE AND OREGON PILE TEST BLOW COUNTS VS. FRICTION PILE RESISTANCE,
by Glen L. Jackson. Jul 65, 28p Technical rept. TR-65-2, Rept. no. 0463
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Foundations (Structures), Tests), (*Shear stresses, Soils), Construction, Bridges, Reinforced concrete, Steel, Wood, Statistical data.

Identifiers: Pile driving, Piling.

Driving resistance of both treated timber and steel (10BP42) piling were obtained from the pile driving records from bridge projects as plotted on standardized forms and correlated with the preplanning foundation density data as obtained from Standard Split-Barrel penetration values and from the Oregon 5-foot Tapered Pile Test penetration values. Also, to give more meaning to the Oregon Tapered Pile Test data, a rough correlation has been obtained between this data and the ASTM Split-Barrel penetration 'N' data. The results of these correlations are presented in graphic form. (Author)

PB-173 364 **Field 13M, 13B**
CFSTI Prices: HC$6.00 MF$1.50
Kentucky Dept. of Highways. Div. of Research.
CONCRETE BRIDGE DECKS: DETERIORATION AND REPAIR, PROTECTIVE COATINGS, AND ADMIXTURES KYHPR 64-2,-3 AND -4; HPR 1 (1),
Research rept.,
by Ronald D. Hughes, and John W. Scott. Jun 66, 292p Rept. no. 595
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Bridges, *Pavements), Kentucky, Degradation, Maintenance, Protective treatments, Additives, Roads, Concrete.

The report is an historical account of damage sustained by new and old concrete bridge decks. An effort has been made to evaluate all bridge decks in Kentucky which (1) have had special admixtures in the concrete, (2) have been repaired by use of varied materials, and (3) have had various protective coatings applied to them. While no conclusive discoveries have been made, several worthwhile, generalized ideas have evolved. Some of the recommendations which were made for concrete bridge decks are as follows: A minimum of 2 inches of concrete should be maintained above reinforcement. Full-width screeding and floating machines should be required. Concreting should not be started until it has been established that there is sufficient equipment for rapid delivery and placement of concrete. Excess concrete should be maintained in front of screed. Slump and air-content tests should be performed on each batch of concrete. Batches not meeting specifications should be rejected. Effort should be made to prevent workmen from walking in fresh concrete. Low areas should be over-filled with fresh concrete. Excessive vibration and over-finishing should be discouraged, and tempering prohibited. Curing compounds should be applied immediately after water-sheen has disappeared. Cleaning and rinsing of decks after heavy application of deicing chemicals and sand should be standard practice. Boiled linseed oil should be applied at 2 to 4-year intervals. In making repairs, remove all unsound concrete and perimeter of such areas sawed to eliminate 'feather-edging.' Air-entrained concrete is recommended for patches, 2 inches in depth or greater. (Author)

PB-173 407 **Field 13M**
CFSTI Prices: HC$6.00 MF$1.50
Maryland Univ., College Park. Dept. of Civil Engineering.
THE SOLUTION OF CONTINUOUS ORTHOTROPIC PLATES ON FLEXIBLE SUPPORTS AS APPLIED TO BRIDGE STRUCTURES. VOLUME II. FIGURES, COMPUTER PROGRAMS, BRIDGE DESIGN EXAMPLE, COMPUTER INPUT AND OUTPUT DATA,
by Conrad P. Heins, Jr., and Charles T. G. Looney. Mar 66, 285p 0493-Vol-2
Progress rept. on Stuy of Effect of New Vehicle Weight Laws on Structures. Prepared in cooperation with Bureau of Public Roads, Washington, D. C. See also PB-173 408.

Descriptors: (*Bridges, Supports), (*Supports, Flexible structures), Metal plates, Programming (Computers), Design, Difference equations.

PB-173 408 **Field 13M**
CFSTI Prices: HC$6.00 MF$1.25
Maryland Univ., College Park. Dept. of Civil Engineering.
THE SOLUTION OF CONTINUOUS ORTHOTROPIC PLATES ON FLEXIBLE SUPPORTS AS APPLIED TO BRIDGE STRUCTURES. VOLUME I. METHODS OF ANALYSES, BRIDGE DESIGN EXAMPLE, BIBLIOGRAPHY,
by Conrad P. Heins, Jr., and Charles T. G. Looney. Mar 66, 222p 049-Vol-1
Progress rept. on Study of Effect of New Vehicle Weight Laws on Structures. Prepared in cooperation with Bureau of Public Roads, Washington, D. C. See also PB-173 407.

Descriptors: (*Bridges, Supports), (*Supports, Flexible structures), Metal plates, Design, Differential analysis, Computers.

The development of orthotropic plate equations is presented and applied to bridge structures. A trigonometric series solution and a finite difference solution of the plate equations is compared. An orthotropic bridge design example is given, using two alternate methods, slope deflection and finite difference methods. The latter portion of the report contains an extensive bibliography on orthotropic plates, load distribution on bridges, bridge decks and slabs and related topics. (Author)

AD-640 963 **See Field 20K**

AD-641 168 **See Field 11L**

AD-641 199 **See Field 13A**

14A. COST EFFECTIVENESS

AD-405 779 **Field 14A**
CFSTI Price: HC$9.60
IBM Space Guidance Center, Owego, N. Y.
CRITERIA FOR DISCARD-AT-FAILURE MAINTENANCE.
Final rept.,
by Eugene G. Wrieden. Mar 63, 99p IBM-63-928-7
Contract AF 30(602)-2681
RADC-TDR-63-140

Descriptors: (*Electronic equipment, *Maintenance), (*Modules (Electronics), Feasibility studies), Mathematical models, Packaged circuits, Microminiaturization (Electronics), Design, Reliability, Costs, Time, Supply depots, Maintenance personnel, Labor, Tables, Logistics, Disposal, Failure (Electronics).

The results of a study to define the significant factors which affect the feasibility of discard-at-failure maintenance (DAFM) for USAF electronic equipment are presented. Included is a mathematical model which can be used to evaluate the total resource cost for DAF and repairable modules. To ensure model usability, a simple step-by-step procedure is presented which minimizes the requirement for complex mathematical manipulations. In addition to determining which is the more economical approach (i.e., design for DAF or design for bit and piece repair), the model provides a means of defining the optimum DAF module size. Also included are discussions of recommended packaging techniques for DAF modules, the impact of microminiaturization on DAFM, and criteria for DAFM design. (Author)

AD-640 678 **See Field 1C**

AD-641 170 **See Field 5A**

N66-37501 **See Field 22A**

14B. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-640 588 **Field 14B, 20F**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
TUNING FORK CHOPPERS FOR INFRARED SPECTROMETERS.
Instrumentation papers,
by Herbert G. Lipson, and James R. Littler. 18 Nov 65, 5p AFCRL-IP-109, AFCRL-66-547
Proj. AF-5620
Task 562003
Availability: Published in Applied Optics v5 n3 p472 Mar 1966.

Descriptors: (*Infrared spectroscopy, Instrumentation), (*Tuning forks, Infrared spectroscopy), Infrared detectors, Frequency, Sensitivity, Photoelectric cells (Semiconductor).

Chopping frequencies of a few hundred cycles per second are required for optimum signal-to-noise performance of many commonly-used photoconductive or photovoltaic detectors. Optical chopping at these frequencies is usually accomplished by the insertion of a cumbersome motor-driven sector wheel somewhere in the optical path. The paper describes a compact tuning fork optical chopper operating in the same frequency range which can be easily installed inside the housing of an infrared spectrometer and adapted for use with a synchronous lock-in amplification system. (Author)

AD-640 779 **Field 14B**
Not available from CFSTI.
Brigham Young Univ., Provo, Utah.
PRESSURE CALIBRATION TO 100 KBAR BASED ON THE COMPRESSION OF NaCl,
by R. N. Jeffery, J. D. Barnett, H. B. Vanfleet, and H. T. Hall. 21 Feb 66, 9p
AROD-2723:9
Availability: Published in Journal of Applied Physics v37 n8 p3172-80 Jul 1966.

Descriptors: (*High-pressure research, Instrumentation), (*Instrumentation, Calibration), Sodium compounds, Chlorides, Pressure, Compressive properties, Barium, Bismuth, Hysteresis.

Identifiers: Sodium chloride.

An independent determination was made of the transformation pressures assigned to the high-pressure transformations in Ba and Bi which are generally used for calibration points. The metals were imbedded in NaCl, and the transitions were detected by the resistance change of the metal while the NaCl lattice parameter was simultaneously measured by x-ray diffraction. The NaCl compression values determined at the fixed points were related to pressure by reference to the semiempirical compression curve of Decker. The Ba I-II and Bi III-V transformations at room temperature were assigned thermodynamic equilibrium values of 53.3 plus or minus 1.2 kbar and 73.8 plus or minus 1.3 kbar, respectively, corresponding to NaCl linear compression values of 0.0510 and 0.0637, respectively. Hysteresis in the transformation pressures was investigated and sample hysteresis was separated from apparatus hysteresis. The hysteresis measurements imply a stress energy which inhibits nucleation of the new phase and causes a sizable sample hysteresis in solid-media systems. (Author)

AD-640 897 **Field 14B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
SIMPLE INTERFEROMETRIC MANOMETER.
Instrumentation papers, revised ed.,
by S. B. Herskovitz. 8 Dec 65, 8p AFCRL-IP-107, AFCRL-66-515
Proj. AF-4642
Task 464203
Revision of manuscript submitted 9 Nov 65.
Availability: Published in The Review of Scientific Instruments v37 n4 p452-5 Apr 1966.

Descriptors: (*Manometers, Interferometers), Refractive index, Gases, Performance (Engineering).

A device employing a Michelson interferometer as an optical refractometer was used to measure gas pressure in the range of 10 Torr and above. The instrument is simple and its test cell bakeable and noncontaminating. With atmospheric gases, using visual fringe readout, an accuracy of plus or minus 1.0 Torr can be achieved over all pressure ranges. The linear relationship between pressure difference and interferometric fringe shift is developed. Effects of gas species, wavelength, and temperature, as well as methods of improving the accuracy, are discussed. Results for nine pure gases and several mixtures are presented. (Author)

AD-640 899 **Field 14B**
Not available from CFSTI.
University of the Witwatersrand, Johannesburg (South Africa). Dept. of Mechanical Engineering.
IMPERFECT STEP FUNCTIONS APPLIED TO CAPACITANCE TRANSDUCER DESIGN,
by K. Posel. Nov 62, 10p Rept. no. 13
Availability: Published in The South African Mechanical Engineer p166-9 Jan 1963, p193-5, Feb 1963.

Descriptors: (*Transducers, Design), Capacitance, Functions, Shock tubes, Diaphragms (Mechanics), Damping.

Contents: The transient response of the single degree of freedom system to an imperfect step function; A new technique for the design of capacitance transducers for shock-tube operation.

AD-641 002 **Field 14B, 9A**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
COMPARATIVE DATA ON CdS TRANSDUCERS FROM 14 Mc/s TO 70 Gc/s,
by Robert Weber. 27 Dec 65, 3p JA-2731
Contract AF 19(628)-5167
ESD-TR-66-234
Availability: Published in Proceedings of the IEEE v54 n2 p333-4 Feb 1966.

Descriptors: (*Cadmium compounds, Sulfides), (*Transducers, Semiconducting films), Performance (Engineering), Electron bombardment, High frequency, Very high frequency, Vapor plating, Acoustics, Ultrahigh frequency, Microwave frequency, Piezoelectric transducers.

The letter reports the results of using a straightforward electron-bombardment technique as opposed to other techniques for the reproducible, indirect-vapor deposition of insulating piezoelectric cadmium sulfide film transducers onto metallic, nonmetallic, and semiconducting materials. Preliminary comparative data are presented concerning the performance of these transducers compared to at least one other possible method of acoustic excitation commonly used in the same situation. (Author)

AD-641 025 **Field 14B, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Automation Industries, Inc., Boulder, Colo. Research Div.
ADVANCEMENT OF ULTRASONIC TECHNIQUES USING RERADIATED SOUND ENERGIES FOR NONDESTRUCTIVE EVALUATION OF WELDMENTS.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 66,
by B. T. Cross, and W. M. Tooley. 1 Apr 66, 26p
Contract NObs-92530
Proj. SR007-10-04
Task 891
See also AD-627 231.

Descriptors: (*Welds, Non-destructive testing), (*Non-destructive testing, *Ultrasonic radiation), Defects (Materials), Ultrasonic properties, Analysis.

Some of the energy radiations which were not included in mode conversion were measured and analyzed. The combined information from the previous work efforts was used in preliminary investigation of weld samples containing actual defects. The Delta was used in various configurations, each exploiting a distinct characteristic of the Delta operation. Combinations of these Delta characteristics provided Delta scan recordings showing excellent correlation with radiographs of the respective weld samples. The Delta Technique is a method of ultrasonic weld inspection using a two search unit configuration. The transmitted energy is angled into the weld region from a search unit positioned to one side of the weld. Flaw information is received with the other search unit positioned directly over the weld. In the Delta Technique, flaw information is not dependent on a preferred defect orientation; however, the receiver search unit must be directly over the defect. The work performed to date is encouraging, because all test results support the Delta concept as an ultrasonic weld inspection technique that is unrestricted by defect orientation and is capable of inspecting welds at the rate of several feet per hour. (Author)

AD-641 026 **Field 14B, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Automation Industries, Inc., Boulder, Colo. Research Div.
ADVANCEMENT OF ULTRASONIC TECHNIQUES USING RERADIATED SOUND ENERGIES FOR NONDESTRUCTIVE EVALUATION OF WELDMENTS.
Quarterly progress rept. no. 4, 1 Apr-30 Jun 66,
by B. T. Cross, and W. M. Tooley. 5 Jul 66, 21p
Contract NObs-92530
Proj. SR007-10-04
Task 891
See also AD-641 025.

Descriptors: (*Welds, Non-destructive testing), (*Non-destructive testing, *Ultrasonic radiation), Defects (Materials), Analysis, Ultrasonic properties.

Various Delta Configurations, including oscillating search units, were used to evaluate butt welds containing natural defects. A Schlieren optical system was used to photograph the characteristic sound beam patterns associated with the operations of the Delta technique. The Delta Technique is a multi-search unit method of ultrasonic weld inspection. Incident energy in angled into the weld region from two transmitters positioned transverse to the weld length, one on each side of the weld. Flaw information is received with a third search unit positioned directly over the weld. Flaw information is not dependent on preferred flaw orientation, although the receiver must be directly over the defect. (Author)

AD-641 12 **Field 14B**
CFSTI Prices: HC$3.00 MF$0.75
Boeing Scientific Research Labs., Seattle, Wash.
TRANSIENT THERMOMETRY WITH INERT THERMOMETERS,
by J. C. Erdmann, and J. A. Jahoda. May 66, 74p
D1-82-0537

Descriptors: (*Thermometers, Measurement), (*Heat exchangers, Thermal conductivity), Thermal diffusion, Mathematical analysis.

A thermometer in contact with a test specimen is inert, if its heat capacity is not small compared with the heat capacity of the test specimen. The response of the thermometer to a transient temperature of the specimen can then be described by a transfer function. Solutions are obtained for the single thermometer and the differential thermometer in contact with a slab whose ends are at zero temperature. Significant simplifications arise, if the inertia of the thermometer is large. The result is applied to (a) the determination of the position and strength of instantaneous heat sources from the observation of thermal transients, (b) the determination of the heat rate function from the observed temperature transient in the uniformly heated slab. Experiments with localized instantaneous heat sources are described. The sources were activated by plastic deformation at helium temperatures. The temperature transfer functions are determined and the position and strength of the heat sources found. (Author)

AD-641 131 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile and Space Div.
MEASURING TECHNIQUES APPLIED IN DETERMINING THE PERFORMANCE OF AN MHD AUGMENTED SHOCK TUNNEL.
Technical information series.

by Clarence J. Harris, John R. Mallin, and David A. Rogers. Oct 66, 31p R66SD53
Contracts AF 40 (600)-1091, AF 40 (600)-1161

Descriptors: (*Shock tubes, Magnetohydrodynamics), Performance (Engineering), Test methods, Test equipment, Pressure, Voltage, Probes, Measurement, High-speed cameras.

The determination of the detailed performance of an MHD augmented high enthalpy shock tunnel required the simultaneous measurement of a large number of aerodynamic, electrical, and electromagnetic parameters in a test time interval of the order of several hundred microseconds. An extensive measuring system was set-up, evaluated and in now being used to acquire facility performance data. This paper describes this measuring system, discusses the modifications and adaptations applied to make the various components of the system operable and compatible, and gives illustrative examples of the performance of the system.

AD-641 144 **Field 14B, 7D**
Not available from CFSTI.
Florida Univ., Gainesville. Dept. of Chemistry.
CONSTRUCTION AND OPERATION OF A SIMPLE EXPONENTIAL DILUTION FLASK FOR CALIBRATION OF GAS CHROMATOGRAPHIC DETECTORS.
Interim rept.,
by H. P. Williams, and J. D. Winefordner. 22 Dec 65, 4p
Grant AF-AFOSR-739-65
Proj. AF-9710
Task 971003
AFOSR-66-1637
Availability: Published in Journal of General Chemistry p271-2 Jul 1966.

Descriptors: (*Gas chromatography, Instrumentation), Calibration, Probes, Containers, Samplers, Gas flow.

The construction and operation of an exponential dilution flask for calibration of gas chromatographic detectors is described. With minimum sampling problems, the device is simple to construct and allows determination of analytical curves and also carrier gas flow rates if the detector response is linear with sample concentration. This device also points out flaws in detector systems. (Author)

AD-641 255 **Field 14B**
Not available from CFSTI.
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
TEMPERATURE CONTROLLED STAGE FOR ELECTRON PROBE MICROANALYZERS,
by E. L. Miller, and D. B. Wittry. 4 Oct 65, 4p
Grant AF-AFOSR-76-63
Proj. AF-9761
Task 976103
AFOSR-66-1659
Availability: Published in The Review of Scientific Instruments v37 n1 p5-6 Jan 1966.

Descriptors: (*Microanalysis, Probes), (*Probes, Temperature control), Electrons, Laboratory equipment.

Maximum utilization of electron probe instruments has heretofore been limited by the lack of a means to vary the temperature of specimens under study. Varying the specimen temperature would make it possible to study mechanisms for recombination of electron hole pairs in semiconductors, thermal excitation of trapping states in alkali halides, and phase transformations in metallurgical materials. Development of such a system was prompted at this Laboratory by the need to study rediative recombination in semiconductors at low and elevated temperatures, but the apparatus should be useful in any investigations requiring temperature control of a movable specimen when space or accessibility is limited. (Author)

AD-641 294 **Field 14B**
Not available from CFSTI.
Pittsburgh Univ., Pa. Dept. of Physics.
SIMPLE PULSED NUCLEAR-MAGNETIC RESONANCE SPECTROMETER.
by I. J. Lowe, and D. Whitson. 27 Sep 65, 5p
Grant AF-AFOSR-196-63
Proj. AF-9761
Task 976101
AFOSR-66-1235
Availability: Published in American Journal of Physics v34 n4 p335-8 Apr 1966.

Descriptors: (*Spectrum analyzers, Nuclear magnetic resonance), Pulse systems, Pulse generators.

A relatively simple, incoherent, variable frequency pulsed nuclear-magnetic resonance spectrometer is described. It uses mostly commercial units and can examine materials with T sub 2's greater than 50 usec. (Author)

N66-30173 **Field 14B**
CFSTI Prices HC$3.00 MF$0.75
Northrop Space Labs., Hawthorne, Calif.
DEVELOPMENT OF A METEOROID PENETRATION DISTRIBUTED TRANSDUCER QUARTERLY REPORT NO. 4, MAR.-MAY 1966.
by H. R. Novotny. Jun 66, 70p NASA-CR-76102, NSL-65-138-4
Contract NAS8-20194

Descriptors: *Aluminum, *Hypervelocity impact, *Impact test, *Laser, *Micrometeoroid, *Target penetration, Crystal, Hypervelocity, Impact, Penetration, Photograph, Plate, Quartz, Sensor, Simulation, Stress, Target, Test, Transducer, Velocity, Wave.

For abstract, see STAR 04 17.

N66-30303 **Field 14B**
CFSTI Prices HC$3.00 MF$0.75
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
THE HOT WIRE ANEMOMETER.
by R. C. Potter. Dec 64, 75p NASA-CR-76135, WR-64-8
Contract NAS8-11312

Descriptors: *Flow measurement, *Hot-wire anemometer, *Turbulent flow, Accuracy, Anemometer, Application, Cooling, Dimension, Equation, Flow, Hot wire, Measurement, Transverse, Turbulent, Velocity, Wire, Yaw.

For abstract, see STAR 04 17.

N66-30433 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
DESCRIPTION OF A DEVICE FOR THE ACCURATE READING OF ACTIVITY PROFILES.
Descrizione Di Una Apparecchiatura Per La Lettura Precisa Dei Profili Di Attivita' Sui Radiocromatogrammi
by S. Forcheri, and V. Wagner. May 66, 28p
EUR-2955.I
In Italian, English Summary

Descriptors: *Adsorption, *Chromatography, *Radiochemistry, Activity, Cesium, Chemical, Coefficient, Collimator, Device, Diffusion, Equation, Geiger counter, Liquid, Medium, Metal, Model, Nuclear, Optical, Plate, Profile, Radiation, Thallium, Tracer, Zone.

For abstract, see STAR 04 17.

N66-30528 **Field 14B**
CFSTI Prices HC$7.17 MF$2.00
American Machine And Foundry Co., York, Pa. Industrial Products Group.
OPERATION, MAINTENANCE AND DATA, APOLLO DOCKING TEST DEVICE, AMF PART NO. 359-60001 TECHNICAL MANUAL.
May 66, 417p NASA-CR-65418
Contract NAS9-4300

Descriptors: *Apollo project, *Docking, *Flight simulation, *Handbook, Device, Emergency, Flight, Handling, Installation, Maintenance, Operation, Repair, Replacement, Shutdown, Simulation, Starting, Storage, Test.

For abstract, see STAR 04 17.

N66-30536 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
Aerojet-general Corp., Azusa, Calif. Life Systems Div.
DEVELOPMENT AND FABRICATION OF AN INSTRUMENT TO MEASURE INTEGRATED SKIN TEMPERATURE FINAL REPORT.
Jun 66, 42p NASA-CR-65415
Contract NAS9-4067

Descriptors: *Human body, *Measuring apparatus, *Skin temperature (biol), Apparatus, Body, Environment, Functional, Human, Instrument, Life, Measurement, Measuring, Science, Sensor, Skin, Temperature, Test.

For abstract, see STAR 04 17.

N66-30790 **Field 14B**
CFSTI Prices HC$3.00 MF$0.50
Union Carbide Corp., Fostoria, Ohio. Carbon Products Div.
CARBON ELECTRODE DEVELOPMENT PROGRAM FINAL REPORT, 3 NOV. 1964 - MAY 1965.
24 May 66, 52p NASA-CR-65411
Contract NAS9-3699

Descriptors: *Carbon arc, *Electrode, *Sputtering, Arc, Carbon, Improvement, Joint, Positive, Reliability, Simulation Solar, Strength.

For abstract, see STAR 04 17.

N66-30800 **Field 14B**
CFSTI Prices HC$1.00 MF$0.50
Wyle Labs., Inc., Huntsville, Ala.
REVIEW OF PROPOSED CONTROL AND INSTRUMENT ROOM FOR BUILDING 4776, MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA.
by R. C. Potter. May 66, 12p NASA-CR-76332
Contract NAS8-11312

Descriptors: *Acoustics, *Construction, *Noise reduction, *Test facility, Cold, Facility, Flow, Level, Noise, Pressure, Reduction, Room, Simulation, Sound, Test, Thermal.

For abstract, see STAR 04 17.

N66-31215 **Field 14B**
CFSTI Prices HC$4.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
DESCRIPTION OF THE DEEP SPACE NETWORK OPERATIONAL CAPABILITIES AS OF JANUARY 1, 1966.
by W. H. Bayley, G. E. Lairmore, and R. Stevens. 1 Jul 66, 118p NASA-CR-76378, JPL-TM-33-255
Contract NAS7-100

Descriptors: *Communication system, *Deep space instrumentation facility (dsif), *Operations research, Antenna, Capability, Circuit, Communication, Computer, Data, Deep, Dsif, Facility, Ground, Instrumentation, Network, Operation, Performance, Processing, Research, Space, Spacecraft, System, Telemetry, Tracking, Video.

For abstract, see STAR 04 17.

N66-31365 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
Boeing Co., Huntsville, Ala. Space Div.

PASSIVE INSTRUMENTATION AND STIMULI GENERATION FOR SATURN IB EQUIPMENT CHECKOUT. VOLUME I - SUMMARY TECHNICAL REPORT FINAL TECHNICAL REPORT, 26 JUN. 1965 - 31 MAY 1966.
by H. N. Kaushagen, and K. L. Skinner. 1966, 32p
NASA-CR-76404, D5-13268-1
Contract NAS8-20090

Descriptors: *Checkout equipment, *Nondestructive testing, *Saturn ib launch vehicle, Checkout, Chemical, Coupling, Electric, Equipment, Field, Infrared, Instrumentation, Magnetic, Mechanical, Nondestructive, Nuclear, Passive, Response, Sensor, Stimulus, Testing, Thermal.

For abstract, see STAR 04 17.

N66-31770 **Field 14B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME RESULTS FROM THE IMP-1 GM COSMIC RAY DETECTOR.
by V. K. Balasubrahmanyan, G. H. Ludwig, F. B. Mc donald, and R. A. Palmeira. 1964, 21p
NASA-TM-X-57736
Pesquisas Fis., 1964 21 P Presented At The Clarcfe Meeting, Buenos Aires, Aug. 1964 Notas De Fisica, Vol. Xi, No. 12

Descriptors: *Cosmic ray, *Detector, *Imp, *Radiation intensity, Cosmic, Explorer xviii satellite, Field, Galaxy, Intensity, Magnetic, Monitor, Neutron, Radiation, Ray, Telescope, Variation.

For abstract, see STAR 04 17.

N66-31861 **Field 14B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COPPER MAGNETORESISTANCE DEVICES AS MAGNETOMETERS.
by W. R. Hudson. Aug 66, 13p NASA-TN-D-3536

Descriptors: *Copper, *Magnetometer, *Material testing, Diameter, Field, Magnetic, Material, Polycrystal, Property, Ratio, Resistance, Testing, Wire.

For abstract, see STAR 04 17.

N66-32138 **Field 14B**
CFSTI Prices HC$3.00 MF$0.75
Honeywell, Inc., Boston, Mass. Radiation Center.
OCULOMETER INTERIM TECHNICAL REPORT, 25 FEB. - 25 DEC. 1965.
by J. Merchant. 31 Jan 66, 108p NASA-CR-76637
Contract NASW-1159
Its Doc.-66-4

Descriptors: *Cornea, *Eye movement, *Optical tracking, Angular, Breadboard, Characteristic, Design, Direction, Electronic, Eye, Human, Measurement, Mechanical, Monocular, Movement, Oculomotor, Optical, Performance, Point, Reflection, Sound, System, Telescope, Tracking.

For abstract, see STAR 04 17.

N66-32281 **Field 14B**
CFSTI Prices HC$0.30 MF$0.50
Southwest Research Inst., San Antonio, Tex.
VIBRATING DIAPHRAGM PRESSURE TRANSDUCER.
by J. D. King. 1964, 28p NASA-SP-5020
Prepared For Nasa

Descriptors: *Cost estimate, *Energy loss, *Pressure transducer, *Wind tunnel, Acceleration, Composition, Construction, Cost, Damping, Diaphragm, Energy, Estimate, Gas, Loss, Measurement, Moisture, Pressure, Sensitivity, Stability, Transducer, Tunnel, Vibration, Wind.

For abstract, see STAR 04 17.

N66-32623 **Field 14B**
CFSTI Prices HC$3.25 MF$1.25
Boeing Co., Renton, Wash. Airplane Div.
367-80 VARIABLE STABILITY SIMULATION SYSTEM (NASA AMES LARGE TRANSPORT SIMULATION PROGRAM).
by G. W. Baska, and R. E. Robbins. 1966, 183p
NASA-CR-62037, D6-19860
Contract NAS2-3224

Descriptors: *Boeing 707 aircraft, *Landing simulation, *Subsonic speed, *Transport aircraft, Aircraft, Approach, Control, Dynamics, Flight, Jet, Landing, Large, Simulation, Speed, Subsonic, Transport.

For abstract, see STAR 04 17.

N66-36766 **Field 14B**
CFSTI Prices HC$7.36 MF$2.25
Hughes Research Labs., Malibu, Calif.
RESEARCH ON GRAVITATIONAL MASS SENSORS FINAL REPORT, 15 OCT. 1964 - 15 APR. 1966.
by R. L. Forward. 1966, 436p NASA-CR-77933
Contract NASW-1035

Descriptors: *Gravitational field, *Mass distribution, *Sensor, Air, Asteroid, Bearing, Detector, Distribution, Field, Gravitational, Inertial, Magnetic, Mass, Moon, Mount, Radiation, Rotation, Tensor, Vibration.

For abstract, see STAR 04 22.

N66-37026 **Field 14B**
CFSTI Prices HC$3.75 MF$1.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
GENERAL PURPOSE AIRBORNE SIMULATOR - CONCEPTUAL DESIGN REPORT.
by D. C. Clark, and J. Kroll. Aug 66, 244p
NASA-CR-544
Contract NAS4-607

Descriptors: *Aircraft stability, *Flight simulator, Airborne, Aircraft, Calculation, Construction, Control, Feedback, Flight, Gain, Jet star aircraft, Loop, Method, Model, Operation, Performance, Response, Simulator, Stability, Variable.

For abstract, see STAR 04 22.

N66-37149 **Field 14B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TEMPERATURE CONTROL UNIT FOR SOUNDING ROCKET APPLICATIONS.
by K. Fredga, and R. S. Lee. Oct 66, 13p NASA-TN-D-3491

Descriptors: *Optical filter, *Solid state device, *Sounding rocket, *Temperature control, Aerobee rocket, Birefringence, Circuit, Control, Design, Device, Electronic, Filter, Heat, Mechanical, Optical, Pump, Rocket, Solid, Sounding, State, Temperature, Thermoelectric.

For abstract, see STAR 04 22.

N66-37305 **Field 14B**
CFSTI Prices HC$3.00 MF$1.00
Massachusetts Inst. Of Tech., Cambridge. Experimental Astronomy Lab.
ANALYTICAL AND EXPERIMENTAL INVESTIGATIONS OF LOW LEVEL ACCELERATION MEASUREMENT TECHNIQUES.
by P. K. Chapman, J. T. Egan, and S. A. Ezekiel.
Apr 66, 144p NASA-CR-78050, RE-23
Contract NGR-22-009-080

Descriptors: *Accelerometer, *Sensitivity, Acceleration, Apparatus, Calibration, Construction, Detection, Displacement, Hardware, Interferometer, Laser, Low level, Measuring, Meissner effect, Suspension,

For abstract, see STAR 04 22.

PB-173 179 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS.
Sep 66, 50p

Descriptors: (*Naval research, Reports), (*Charcoal, Non-destructive testing), (*Cryogenics, Vacuum), Atmosphere, Astrophysics, Chemistry, Electricity, Mechanics, Metallurgy, Ceramic materials, Optics, Radio communication systems, Sound.

A nondestructive method for determining the residual gas life of charcoal beds; A motor and lubricant for vacuum operation of cryogenic temperatures; SPAD Formatter: the buffer interface between the satellite prediction computer and the display; Atmosphere and astrophysics; Chemistry; Electricity; Mechanics; Metallurgy and ceramics; Optical physics; Radio; Sound.

PB-173 183 **Field 14B, 20I, 18A**
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
ETUDE ET REALISATION D'UN ANALYSEUR DE SIGNAUX A HAUTE FREQUENCE (Study and Realisation of a High Frequency Analyzer),
by Jean Bourbigot. 1966, 60p CEA-R-2942
EUR-2701-f
Text in French; Attached Summary in English.

Descriptors: (*Frequency analyzers, High frequency), (*Plasma oscillations, Frequency analyzers), Electromagnetic waves, Spectrum analyzers, Bandwidth, Circuits, France.

The device is designed for the amplitude and frequency analysis of electric or electromagnetic signals in the frequency range of 0 to 55 MHz. The frequency spectrum of a preset bandwidth is displayed on the screen of an oscilloscope. Conceived to analyse the electromagnetic oscillations that can be generated in a plasma, its main characteristics are the following: (1) extended bandwidth of analysed frequencies, on both sides of the ion cyclotron frequency in a magnetic field up to 20 kGs; (2) linear amplitude and frequency response; (3) possibility of analysing a narrow band; (4) high sensitivity; (5) analysis repetition rate of 25 per second. The different parts of the analyzer are described after a discussion of the choice of the techniques used in their design. In addition to its present use, the device can be applied to perform all the functions of a commercial spectral analyzer. (Author)

UCRL-14944 **Field 14B, 13I**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
SIGNIFICANCE OF THERMAL EFFECTS IN MANUFACTURING AND METROLOGY,
by Eldon Ray McClure. 24 Jun 66, 17p
Contract W-7405-eng-48

Descriptors: (*Machining, Thermal expansion), (*Machine tool industry, Precision finishing).

For abstract, see NSA 20 21.

AD-640 586 **See Field 3B**

AD-640 607 **See Field 5A**

AD-640 990 **See Field 20C**

AD-641 244 **See Field 13D**

NBS-TN-403 **See Field 7D**

N66-30432 **See Field 7C**

PB-173 371 **See Field 7A**

14C. RECORDING DEVICES

AD-403 452 **Field 14C**
CFSTI Price: HC$5.60
American Scientific Corp., Alexandria, Va.
VARIABLE-SPEED RECORDER-REPRODUCER.
Quarterly progress rept. no. 2, 6 Nov 62-12 Mar 63,
by John L. Toth, and Donald E. Reed. 12 Mar 63, 53p ASC-403
Contract DA-36-039-SC-89067

Descriptors: (*Magnetic recording systems, Audio amplifiers), Very low frequency, Extremely low frequency, Noise (Radio), Machines, Drives, Clutches, Packaged circuits, Magnetic tapes.

Finalization of the prototype circuit design was accomplished and tests were carried out. During this period, the problem of hum-elimination in the high-gain playback amplifier was encountered. Equalization circuits were finalized. In the tape transport mechanism several mechanical problems occurred. Certain design changes were necessary to bring the wow and flutter below the level required by the specifications. Finalization of the mechanical design and packaging of both the electronic unit and the tape-deck unit were completed. Printed circuitry was chosen for the electronic unit and conventional wiring for the tape deck itself. A mechanical model was built and the printed boards were designed and made. At the end of the period covered by this report the model was ready for assembly.

AD-640 863 **Field 14C, 19D**
CFSTI Prices: HC$3.00 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
AN EIGHT-CHANNEL HIGH-PERFORMANCE OSCILLOGRAPH RECORDING SYSTEM.
Memorandum rept.,
by B. Soroka, and G. T. Watson. May 66, 63p BRL-MR-1765
Proj. RDT/E-1P014501A33E

Descriptors: (*Blast, Recording systems), (*Recording systems, *Oscillographs), High-speed cameras, Timing devices, Oscilloscopes.

A high-performance, eight-channel, electro-optical recording system for recording pressure-time histories of blast phenomena is described. The system has a frequency response of 0.03 cycles per second to 250 kilocycles per second with an input impedance of 1600 megohms. These are fully adequate characteristics for accurate piezoelectric gage recording. The system can also be used as an eight-channel, single-sweep recording system using Polaroid cameras. The system is characterized by high accuracy, reliability and stability, and provides for ease of operation and maintenance.

N66-37378 **Field 14C**
CFSTI Prices HC$2.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
A CRITICAL SURVEY OF UPPER-ATMOSPHERE DENSITY MEASUREMENTS BY MEANS OF IONIZATION GAUGES.
by M. P. Friedman. 15 Jul 66, 27p NASA-CR-78226, SAO SPECIAL REPT.-217
Grant NSG-87

Descriptors: *Atmospheric density, *Density measurement, *Ionization gauge, *Upper atmosphere, Calibration, Drag, Explorer xvii satellite, Gas, Pressure, Satellite, Survey.

For abstract, see STAR 04 22.

14D. RELIABILITY

AD-640 837 **See Field 17G**

AD-641 112 **See Field 9C**

AD-641 118 **See Field 9B**

AD-641 146 **See Field 12A**

AD-641 172 **See Field 9A**

14E. REPROGRAPHY

AD-640 575 **Field 14E**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
PHOTOMETRIC CALIBRATION OF AUTOMATIC EXPOSURE CONTROL SYSTEMS.
Technical rept.,
by John A. D'Agostino. Aug 66, 18p ECOM-2748
Proj. DA-1E6-20801-A176
Task 1E6-20801-A176-03

Descriptors: (*Camera controls, Calibration), Automatic, Photometers, Aerial cameras, Tests.

Photometric equipment and techniques designed to calibrate photographic automatic exposure control systems are presented. A J.A. Maurer Automatic Exposure Control, Model 1222, designed for aerial use is tested by these means and the calibration test results are presented, discussed, and compared with both the manufacturer's specifications and the standard aerial exposure index. Future refinements of these techniques are outlined. (Author)

AD-640 957 **Field 14E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
LUMINESCENT INTENSIFICATION,
by E. A. Bukatin. 25 Apr 66, 7p FTD-TT-66-34 TT-66-10389
Unedited rough draft trans. of Zhurnal Nauchnoi i Prikladnoi Fotografii i Kinematografii (USSR) v10 n3 p219-20 1965.

Descriptors: (*Photographic images, Intensity), (*Luminescence, Photographic images), Illumination, Photographic techniques, Photographic chemicals, USSR.

The conversion of a silver photographic image into a luminescent one is described.

N66-30352 **Field 14E**
CFSTI Prices HC$2.00 MF$0.50
SOLID-STATE WIDE-RANGE LOW POWER CAMERA TIMER FOR SPACE APPLICATIONS.
by J. C. Thornwall. May 66, 28p NASA-TM-X-55529, X-614-66-192

Descriptors: *Aerobee rocket, *Camera shutter, *Timing apparatus, Apparatus, Application, Camera, Circuit, Electronic, Exposure, Low power, Shutter, Solid, Space, Specification, State, Time, Timing, Voltage, Waveform.

For abstract, see STAR 04 17.

N66-31480 **Field 14E, 3B**
CFSTI Prices HC$7.00 MF$1.75
Harvard Univ., Cambridge, Mass.
HIGH-RESOLUTION PLANETARY PHOTOGRAPHY AND THE DETECTION OF LIFE.
by C. Sagan. 15 Jun 66, 9p
Caltech-jpl Lunar And Planetary Conf. 15 Jun. 1966 P 279-287 Refs (See N66-31446 18-30)

Descriptors: *Extraterrestrial life, *Life detector, *Planetary exploration, *Satellite photography, Conference, Detection, Detector, Exploration, Extraterrestrial, High resolution, Life, Mariner iv space probe, Military, Nimbus satellite, Photography, Planetary, Reconnaissance, Satellite, Tiros satellite.

For abstract, see STAR 04 17.

N66-31929 **Field 14E**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Langley Research Center, Langley Station, Va.
AN EXPANSION OF THE EV SYSTEM.
by W. F. Lindsey. 1965, 13p NASA-TM-X-57747
Presented At The 10th Ann. Tech. Symp. Of The Soc. Of Photo-opt. Instr. Engr., San Francisco, 16-20 Aug. 1965

Descriptors: *Flash, *Light intensity, *Photography, Additive, Electronic, Equation, Exposure, Factor, Film, Filter, High intensity, Intensity, Light, Photometry, Speed, System, Table, Transmittance, Value.

For abstract, see STAR 04 17.

N66-37272 **Field 14E**
CFSTI Prices HC$2.00 MF$0.50
Documentation, Inc., College Park, Md.
THE INTRODUCTION OF MICROFICHE FOR DISSEMINATING TECHNICAL INFORMATION IN THE UNITED STATES.
by D. S. Price. May 66, 28p NASA-CR-62032
Contract NASW-1315

Descriptors: *Information processing, *Microfilm, Camera, Duplication, Film, Format, Information, Processing, Ratio, Reduction, Size, Technical.

For abstract, see STAR 04 22.

N66-37274 **Field 14E**
CFSTI Prices HC$2.50 MF$0.75
Bellcomm, Inc., Washington, D. C.
LUNAR ORBITER PHOTOGRAPHIC DATA ANALYSIS FOR APOLLO LANDING HAZARD APPRAISAL.
by C. S. Sherrerd. 27 Jul 66, 60p NASA-CR-78176, TR-66-340-3
Contract NASW-417

Descriptors: *Apollo project, *Data analysis, *Lunar orbiter, *Photography, *Safety hazard, Analysis, Computer, Data, Hazard, Landing, Lunar, Orbiter project, Processing, Quantity, Safety.

For abstract, see STAR 04 22.

AD-640 589 **See Field 8E**

AD-640 864 **See Field 15D**

N66-32193 **See Field 3B**

PB-173 374 **See Field 5B**

15B. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-640 953 **Field 15B, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Franklin GNO Corp., West Palm Beach, Fla.
INVESTIGATION OF ELECTRON ATTACHMENT CHARACTERISTICS OF SPECIFIC CANDIDATE MATERIALS IN ATMOSPHERIC AIR.

Technical summary rept., 3 May 65-1 Aug 66 on phase 1,
by Robert W. Crowe. 15 Aug 66. 59p Rept. no. 266
Contract Nonr-4977 (00)
Proj. NR-303-710

Descriptors: (*Poisonous gases, Detection), (*Electron capture, Poisonous gases), Air, Gas analysis, Instrumentation, Gas ionization, Sarin, Organic phosphorus compounds, Phosphites, Toxic agent alarms, Chemical warfare agents.

Identifiers: Dimethyl hydrogen phosphites, Trimethyl phosphites.

A method was developed for detection of certain undesirable materials in the atmosphere. The method relies on the fact that most undesirable materials have strong affinities for free electrons of thermal energy. The complete apparatus consists of a high vacuum system, a mechanically pulsed ultraviolet light source, a mechanically driven magnetic pickup head with associated electronics for providing the pulsing sequence desired, and an attachment drift chamber. The latter consists of a photocathode, several guard rings to insure a uniform electric field, a control grid, and a collector anode whose current is read by means of an electrometer. The magnitude of the current as a function of time, provides the necessary information regarding electron attachment by the constituents present in the atmosphere. The simulant candidate materials dimethyl hydrogen phosphite and trimethyl phosphite were examined in the drift chamber and found to be detectable at concentrations down to less than one part in 1 million. Using a continuous flow technique, Sarin was introduced into the drift chamber at a concentration of one part in 1 million and detected through the production of negative ions by electron capture. The method should be feasible for the detection of other toxic materials in the atmosphere at low concentrations. (Author)

AD-640 895 See Field 6O

15C. DEFENSE

AD-640 543 See Field 13L

AD-640 619 See Field 5D

AD-641 156 See Field 5C

15D. INTELLIGENCE

AD-640 864 **Field 15D, 22A, 14E**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
INSPECTION BY SMALL SATELLITES,
by Merton . Davies. Oct 66, 19p P-3410

Descriptors: (*Aerial photography, Spacecraft cameras), (*Photographic intelligence, Spacecraft), Launch vehicles (Aerospace), Arms control, Feasibility studies.

Prospects are presented on the use of inspection satellites for obtaining photographs of the earth. It is suggested that the satellites would disclose military buildups and violations of certain arms control agreements.

15E. LOGISTICS

AD-344 705 **Field 15E, 5A, 9B**
CFSTI Price: HC$6.60
RAND Corp., Santa Monica, Calif.
A DATA PROCESSING CONCEPT FOR AIR FORCE BASES.
Research memo.,
by J. A. Postley, and S. L. Pollack. 5 Sep 58. 70p RM-2232

Descriptors: (*Armed forces supplies, Data processing systems), (*Management control systems, Armed forces supplies), (*Logistics, Air Force), Air force budgets, Digital computers, Military facilities, Decision making, Input-output devices, Inventory control, Air force procurement.

Dispersal of Air Force installations is increasing greatly the number of units requiring data processing. It also tends to diminish the technical capability of each unit to handle this task. Centralized and largely automatic data processing systems, as outlined in this report, seem to be a desirable answer to this problem. The equipment needed for such systems is now available or becoming available. Its application to Air Force material needs can be achieved within the next few years. This report discusses the broad concepts of automatic input and processing of data, and explains their importance to expeditious managerial control. Many detailed aspects of these concepts are under study in order to devise methods for their implementation.

AD-467 952 **Field 15E, 9A**
CFSTI Prices: HC$11.60 MF$0.75
Paratron Div., Litton Precision Products, Inc., Mount Vernon, N. Y.
BUREAU OF NAVAL WEAPONS STANDARDIZATION OF FSC 6105, 66, 6125, TECHNICAL ANALYSIS OF SERVO MOTORS, TACHOMETER GENERATORS, AND MOTOR TACHOMETER GENERATORS,
by E. Segment, and M. Sapsowitz. 28 Feb 63. 114p
Contract NOw-62-0982
Proj. 6105-0050

Descriptors: (*Servomotors, Standardization), (*Tachometers, Standardization), Electric motors, Generators, Costs, Handling, Data, Tables, Spare parts, Specifications.

This technical analysis is part of the Department of Defense Standardization Program, which is intended to promote efficient procurement and minimize stocking and handling costs. The components covered by this study are in FSC 6105, 66, and 6125, and consist of servo motors, tachometer generators, and motor tachometer generators respectively. By means of technical analysis of both the physical dimensions and performance specifications of these components, they have been categorized as preferred items, current items, maintenance items, obsolete items, duplicate items, etc. This data is tabulated and summarized in this report, along with a description of the manner in which the evaluation was effected. As presented in sections (2) and (3), it is now available for use in furthering the primary goal of standardization - the reduction in the number of different items in the supply system.

AD-640 594 **Field 15E**
Not available from CFSTI.
RAND Corp., Santa Monica, Calif.
LOGISTICS IN RECENT SOVIET MILITARY WRITINGS.
Memo rept.,
by Andris Trapans. Aug 66, 37p RM-5062-PR
Contract AF 49 (638)-1700
Availability: Hard copy available from Rand Corp., Santa Monica, Calif. $2.00.

Descriptors: (*Logistics, USSR), Military publications, Nuclear warfare, Transportation, Cargo vehicles.

The increasing emphasis on logistics in Soviet military publications is analyzed in terms of two specific problems: the scope of logistic activities during a nuclear conflict, and alternative means of transport for resources. Soviet military periodicals published between 1964 and 1966 reflect the impact of logistical ideas expressed in Sokolovskii's 'Military Strategy' and a new emphasis on the logistics of nuclear war. Military economists and logisticians now stress the peacetime accumulation of stocks and forces for wartime use. On the question of transport, the viability of railroads is under debate. Large tactical pipelines, to be laid immediately after advancing troops, are considered as second only to motor transport of fuel. Consideration is also being given to the air delivery of fuel to missile forces, using cargo aircraft, helicopter, and airdrop. (Author)

AD-640 629 **Field 15E**
CFSTI Prices: HC$4.00 MF$1.00
United States Rubber Co., Mishawaka, Ind.
LIGHTWEIGHT INSULATED FOOTWEAR.
Technical rept.,
by Robert W. Pooley, Leighton E. Fisher, Alexander D. Shaw III, and Conrad S. Rohs. Sep 66. 150p
Contract DA-19-129-AMC-690 (N)
Proj. DA-1M643303-D547
C/OM-26, USA-NLABS-TR-67-23-CM

Descriptors: (*Shoes, Materials), Thermal insulation, Weight, Moistureproofing, Elastomers, Plastics, Metals, Textiles, Adhesives, Coatings.

Identifiers: Boots.

A number of candidate materials were compounded, tested, and evaluated with an aim toward the development of a lightweight (15 oz. per boot), impermeable, (water absorption maximum weight 5%), insulated, (for service down to -20 deg.) boot for periods of up to 2 hours of inactivity. These materials included expanded elastomers and plastics, solid plastics, metals, fabrics, adhesives, and coating materials. Design and fabrication studies were conducted to incorporate the most promising materials into a prototype boot, and to determine the insulating properties of the materials used singly and in combination with each other. Based on the data obtained, prototype boots were assembled. An experimental pull-on type boot weighing 15 1/2 ounces was worn by the Project Officer in the Climatic Test Chambers at the U. S. Natick Laboratories at -30F. for a period of 2 hours. These studies indicate the feasibility of producing lightweight insulated boots through materials research. (Author)

AD-640 731 **Field 15E**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE RAND LOGISTICS RESEARCH PROGRAM 1966,
by Murray A. Geisler. Sep 66, 19p P-3447
Prepared for presentation at World Wide Material Conference, U.S.A.F. Academy, Colo., Oct 12-14 66.

Descriptors: (*Logistics, Scientific research), Inventory control, Management engineering.

Areas of logistics research included are: (1) New techniques for setting and manipulating inventory levels. (2) Changes in supporting TAC forces in peace and in war. (3) Airlift in the 1970's. (4) New Management Systems.

AD-641 247 **Field 15E**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
CAMOUFLAGE PRINTING OF NOMEX SUMMER FLYING COVERALLS.
Final rept.,
by Maria A. Chianta. 30 Sep 66. 11p NADC-MR-6619

Descriptors: (*Flight clothing, *Camouflage), Fire resistant materials, Printing, Colors, Dyes, Flammability.

Identifiers: Nomex yarns.

An investigation was carried out to determine the effectiveness of Nomex summer flying coveralls

printed with a camouflage pattern as compared with the standard plain olive green coveralls. Laboratory tests indicated that camouflage printing of staple Nomex in a resin-bonded pigment system does not significantly alter the flame-resistant characteristics of Nomex. Field tests with Marine units showed that the camouflage system considered here offered very little advantage over the ordinary olive-green Nomex suits in concealment in green leafy areas and neither suit contributes to concealment in predominantly bronwn surroundings. (Author)

AD-640 697 See Field 12B

AD-640 768 See Field 12B

AD-640 869 See Field 12B

15F. NUCLEAR WARFARE

AD-640 626 Field 15F, 18C
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
EVALUATION OF NUCLEAR WEAPON THERMAL THREAT.
Technical memo. (Final),
by Floyd I. John, and Thomas O. Passell. Aug 66, 95p
Contract OCD-PS-64-201
Proj. SRI-4949-360
SRI-4949-360.

Descriptors: (*Nuclear explosion damage, Urban areas), (*Fires, Hazards), Analysis, Thermal radiation, Ignition, Structures, Clouds.

The threat to urban areas from fires produced by the detonation of a nuclear weapon may be measured in terms of the proportion of structures that will contain one or more significant fires, i.e., fires producing a flashover. In the study, this proportion is determined for uncrushed structures in which the ignition of an interior fuel by thermal radiation from a nuclear weapon results in at least one significant fire. The proportions of structures containing a significant fire in different land-use areas are expressed as functions of the radiant exposure outside structures. The functions depend on such parameters as the weapon yield, height of burst, atmospheric conditions, number of fuels, and exposure of fuels. Scaling relationships for determining parameter values are given. Atmospheric transmission factors for completely overcast skies are given for different elevation angles of the fireball. In addition, a preliminary estimate is made of the conditions under which clouds will be burned out by thermal radiation. (Author)

AD-640 595 See Field 6U

15G. OPERATIONS, STRATEGY, AND TACTICS

AD-101 288 Field 15G
CFSTI Price: HC$1.10
RAND Corp., Santa Monica, Calif.
AIR BATTLE THEORY: STATISTICAL SURVIVAL ANALYSIS FOR CLOSE CONTROLLED INTERCEPTORS VERSUS BOMBERS.
Research memo.,
by G. E. Gompf. 29 Aug 49, 9p RM-239
Contract AF 33 (038)-6413

Descriptors: (*Aerial warfare, Survival), Bombers, Aircraft interception, Statistical analysis, Probability.

A simplified air battle model was constructed in statistical terms, based upon the assumption that continuous close control of each interceptor can be maintained throughout the battle. The bomber and interceptor losses resulting from this analysis are believed to represent practical upper limits to the attrition rates for air battle. (Author)

AD-468 096 Field 15G, 9B
CFSTI Prices: HC$6.00 MF$1.25
Operations Research Inc., Silver Spring, Md.
THE CAPRI SYSTEM FOR NAVAL PERSONNEL PROGRAM MANAGEMENT. VOLUME I. DESCRIPTION AND OPERATION.
Technical rept.,
by Michael W. Pulscak, Robert Cleveland, Ronald W. Hardy, Eliot Raphaelson, and George Beeker. May 65, 203p TR-322
Contract Nonr-3949 (00)
ND-65-28
See also AD-434 572, Vol. II.

Descriptors: (*Naval personnel, Management planning), (*Personnel management, Naval personnel), Manpower studies, Military requirements, Programming (Computers), Mathematical models, Data processing systems, Naval operations, Naval training.

Identifiers: CAPRI, IBM 7080, IBM 1401.

During the current phase of the Computerized Advance Personnel Requirements and Inventory (CAPRI) development and implementation program, the operational system design was reviewed, approved, programmed, and installed on the Bureau of Naval Personnel's IBM 7080-1401 computers. The CAPRI System is currently being applied to the management of approximately twenty-five weapon systems. The system described in this report was developed to provide the Bureau of Naval Personnel (BuPers) with a management tool for efficient and effective planning, development, production, and control of personnel required to support both new and operational naval weapon systems. The system operates under the concept of and organization for PS program management with the bureau. The volume describes the Personnel Subsystem life cycle which parallels the weapon system life cycle. This spans the period from the issuance of a General Operational Requirement (GOR) to the phase-out of the last operational model of the system or until such time as the operation and maintenance of the weapon system becomes so routine that the PS can no longer be uniquely identified by special Navy Enlisted Classifications (NECs). Two distinct CAPRI subsystems are described: THE Network Planning and Analysis (NP and A) Subsystem and the Billets and Inventory (B and I) Subsystem.

AD-640 618 Field 15G, 5D
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
REVOLUTIONARY WAR,
by Hans Speier. Sep 66, 24p P-3445
This paper was written in 1962 as an unclassified portion of RM-3203-PR.

Descriptors: (*Unconventional warfare, Political science), Counterinsurgency, Guerrilla warfare, Communism, Limited war, Deterrence, Cold war, Economics, History, Foreign aid.

Identifiers: Revolutions (Political).

AD-640 620 Field 15G
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
CONTAINMENT IN ASIA RECONSIDERED,
by David P. Mozingo. Jul 66, 29p P-3435

Descriptors: (*Asia, *Limited war), Foreign policy, China, United States, USSR, Communism.

It is primarily the evolution of nationalism, not the foreign policies or ideology of the Peking government, which frustrates the United States in Asia.

AD-641 084 Field 15G, 12B
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
QUASILINEARIZATION AND INVERSE PROBLEMS FOR LANCHESTER EQUATIONS OF CONFLICT.,
by J. D. Buell, H. H. Kagiwada, and R. E. Kalaba. Aug 66, 14p RM-5119-PR
Contract AF 49 (638)-1700

Descriptors: (*Lanchester equations, *Numerical analysis), (*Operations research, Warfare), Boundary value problems, Military intelligence.

Identifiers: Quasilinearization, Inverse problem, IBM 7044.

Quasilinearization and digital computation are applied to certain problems relating to the Lanchester equations of combat. It is shown how the enemy's strength and replenishment rate can be estimated on the basis of information on friendly units. The problem is phrased as a nonlinear, multipoint, boundary-value problem, and quasilinearization is used for the numerical solution. (Author)

AD-234 653 See Field 5D

AD-237 155 See Field 17G

AD-416 553 See Field 5D

AD-640 592 See Field 12A

16A. MISSILE LAUNCHING AND GROUND SUPPORT

N66-30171 Field 16A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
APOLLO/ SATURN 1 B FLIGHT SAFETY PLAN, VEHICLE AS-203.
1 Jun 66, 20p NASA-TM-X-57587, K-1B-02.13/3

Descriptors: *Apollo spacecraft, *Flight safety, *Saturn ib launch vehicle, Countdown, Flight, Instrumentation, Launch, Plan, Requirement, Restriction, Safety, Space vehicle, Test.

For abstract, see STAR 04 17.

16B. MISSILE TRAJECTORIES

AD-640 964 Field 16B, 8E
CFSTI Prices: HC$2.00 MF$0.50
Army Text and Evaluation Command, White Sands Missile Range, N. Mex. Deputy for National Range Engineering.
EFFECTS OF GEODETIC MEASUREMENT ERRORS ON TRAJECTORY DATA.
Final rept.,
by Robert E. Green. Jun 66, 27p RE-S-66-1
Proj. DA-1-S-2-50206-D-241

Descriptors: (*Geodesics, Errors), (*Tracking, Errors), Guided missile trajectories, Measurement, Guided missile tracking systems.

The report presents the contribution of geodetic measurement errors to the measurement of vehicle position and velocity by trilateration and triangulation methods. Mathematical expressions are derived that describe the propagation of survey measurement errors through coordinate transformations. A numerical example of the error in trilaterative position and velocity determination, resulting from uncertainty in the location of the measuring instrument, is included. (Author)

AD-448 630 See Field 4B

16D. MISSILES

N66-37412 Field 16D
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE EFFECT OF ANTENNA LOCATION ON PITCH/ROLL COUPLING CHARACTERISTICS OF THE APACHE.
by E. E. Mayo, and M. B. Nolan. Aug 66, 46p
NASA-TM-X-55562, X-721-66-395

Descriptors: *Nike-apache rocket, *Pitch control, *Roll control, Antenna, Characteristic, Control, Coupler, Coupling, Effect, Location, Pitch, Rocket, Roll, Sounding.

For abstract, see STAR 04 22.

AD-469 695 See Field 22B

N66-37597 See Field 8N

17A. ACOUSTIC DETECTION

AD-451 393 **Field 17A**
CFSTI Prices: HC$7.00 MF$1.50
General Dynamics Corp., Groton, Conn. Electric Boat Div.
PROCESSING OF DATA FROM SONAR SYSTEMS. VOLUME II.
Rept. for 1 Jul 63-1 Jul 64,
by Allen H. Levesque, Richard A. McDonald, Peter M. Schultheiss, and Theron Usher, Jr. 1 Sep 64, 316p Rept. no. U417-64-028
Contract Nonr-2510 (00)
Subcontracted to Dunham Lab., Yale Univ., New Haven, Conn.

Descriptors: (*Sonar, Data processing systems), Sonar signals, Sonar targets, Detection, Hydrophones, Signal-to-noise ratio, Mathematical analysis, Errors.

This report describes work concerned with the detection and determination of the bearing of a single target in an isotropic noise field. In the cases studied, the data source was assumed to be a single hydrophone or a given array of hydrophones. The problems investigated involved studies of likelihood ratio detection of sinusoidal signals in gaussian noise, likelihood ratio detection of gaussian signals in wide-band noise, and determinations of random bearing errors due to processing and also due to medium inhomogeneity for specific types of sonar systems. (Author)

AD-640 593 **Field 17A, 20K**
CFSTI Prices: HC$2.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aero-Electronic Technology Dept.
DYNAMIC CHARACTERISTICS OF UNDERWATER CABLES FLOW INDUCED TRANSVERSE VIBRATIONS,
by J. Dale, H. Menzel, and J. McCandless. 6 Sep 66, 40p NADC-AE-6620

Descriptors: (*Hydrophones, Cables (Mechanical)), (*Sonar equipment, Hydrodynamics), Underwater, Vibration, Fluid flow.

The dynamic behavior of strumming hydrophone cables associated with air-launched sonobuoy surveillance systems is reported for a 200 to 3000 Reynolds number range. The study techniques and the scaling laws have application wherever underwater flexible cables are employed. Results are reported in four specific areas: experimental diagnostic techniques, cable tuning effects, frequency scaling law, and dynamic motion analysis. (Author)

AD-641 148 See Field 9A

17B. COMMUNICATIONS

AD-109 245 **Field 17B, 5J**
CFSTI Price: HC$2.60
Purdue Univ., Lafayette, Ind.
THE RELATIONSHIP BETWEEN LISTENER ACCURACY AND CONCURRENT PSYCHOMOTOR ACTIVITY.
Technical rept.,
by L. A. Doty, J. W. Asher, T. D. Hanley, and M. D. Steer. 13 Oct 55, 26p
Contract N6ori-104 (02)
Proj. SPECDEVCEN-20-F-8
SPECDEVCEN-104-2-43

Descriptors: (*Psychomotor tests, Hearing), (*Psychoacoustics, Psychomotor tests), Performance (Human), Attention, Analysis of variance.

The major findings obtained in this study are as follows: (1) There were significant differences in listening accuracy scores as a function of the complexity of the psychomotor task performed. Thus, as the task became more complex, the listener accuracy scores decreased. (2) In terms of the time required to complete the tasks, there were significant increases in the error times as the tasks increased. It is recommended that, for personnel whose primary and most important function is auditory reception of information, consideration be given to the reduction or elimination of motor tasks, especially complex manipulative actions or those not closely related to the information received aurally. Conversely, for personnel whose primary and most important function is the execution of complex manipulative tasks, consideration should be given to the reduction or elimination of listening tasks, especially those not closely related to the manipulative tasks they must perform.

AD-127 495 **Field 17B, 5I**
CFSTI Price: HC$1.60
Purdue Research Foundation, Lafayette, Ind.
EVALUATION OF A TAPE RECORDER-REPRODUCER AS A COMPONENT IN A VOICE COMMUNICATION TRAINING DEVICE,
by J. W. Asher, L. A. Doty, T. D. Hanley, and M. D. Steer. 31 Mar 56, 16p
Contract N6ori-104 (02)
SPECDEVCEN-TR-104-2-46

Descriptors: (*Voice communication systems, *Training devices), Recording systems, Speech, Intelligibility, Analysis of variance.

The major findings of the study are summarized as follows: (1) Training conditions in which taped instructions were used were definitely superior to training conditions in which subjects were given no instruction in how to speak more intelligibly. (2) Training conditions in which the recorder-reproducer was used were superior to those in which the device was not used in improving speech intelligibility. (Author)

AD-143 738 **Field 17B, 5I**
CFSTI Price: HC$12.60
Purdue Research Foundation, Lafayette, Ind.
INTELLIGIBILITY OF VOICE COMMUNICATION (A REVIEW OF PAST AND PROJECTED RESEARCH, TRAINING DEVICES AND METHODS).
Technical rept.,
by T. D. Hanley, and M. D. Steer. 17 Jun 57, 125p
Contract N6ori-104 (02)
Proj. 20-F-8
NAVTRADEVCEN-TR-104-2-51

Descriptors: (*Voice communication systems, Intelligibility), (*Training devices, Voice communication systems), Reviews, Speech, Naval personnel, Human engineering, Auditory acuity, Bibliographies.

The major emphasis of this research is on the factor of speech intelligibility. Attention is given to each link in the communication chain, namely, the talker, the message, the mode of communication and the listener. Consideration also given to training in voice communications from the viewpoint of procedure and the use of training devices. Finally, the problem areas of voice communications are discussed with recommended objectives for future research. (Author)

AD-221 573 **Field 17B, 5J**
CFSTI Price: HC$3.60
Purdue Research Foundation, Lafayette, Ind.
RELATIONSHIPS BETWEEN CERTAIN ASPECTS OF PERSONALITY AND SOME VOCAL EFFECTS OF DELAYED SPEECH FEEDBACK.
Technical rept.,
by Bernard Spilka, T. D. Hanley, and M. D. Steer. 28 Oct 54, 31p
Contract N6ori-104 (02)
Proj. 20-F-8
SPECDEVCEN-TR-104-2-37

Descriptors: (*Speech, Stress (Psychology)), (*Personality, Speech), Perception (Psychology), Neuroses, Psychometrics, Behavior, Abnormal psychology, Statistical analysis, Correlation techniques, Intelligibility.

The results obtained from 129 subjects are summarized as follows: (1) Of the variables studied, the amount of change occurring in Vocal Intensity Variation due to delayed speech feedback appears to be the most closely related to personality functioning. (2) Increases in Vocal Intensity Variation appear to be positively related to Self-percept Stability and Paranoid tendencies and negatively related to Rigidity. (3) Decreases in Vocal Intensity Variation appear to be positively related to Schizoid forms of behavior.

AD-42 860 **Field 17B, 5J**
CFSTI Price: HC$3.60
Purdue Univ., Lafayette, Ind.
THE EQUATING OF READING MATERIALS FOR VOCAL RATE-DURATION AND INTENSITY.
Technical rept.,
by Bernard Spilka, and M. D. Steer. 8 Jan 54, 31p
Contract N6ori-104 (02)
Proj. SPECDEVCEN-20-F-8
SPECDEVCEN-104-2-35

Descriptors: (*Speech, Intelligibility), (*Voice communication systems, *Reading), Intensity, Phonetics, Statistical analysis.

The study was undertaken to determine the equivalence of selected reading passages considered to be phonetically balanced with respect to the following voice variables: (1) Rate-duration as measured by the Percent Phonation Time and Average Syllable Duration. (2) Intensity as measured by the Mean Vocal Intensity and the Vocal Intensity Variance. The results obtained from 128 adult male college students are as follows: (1) All eight passages investigated were equivalent in Mean Vocal Intensity. (2) Seven passages (all except Passage H) were equivalent in Mean Syllable Duration. (3) Six passages (all except Passages F and H) were equivalent in Percent Phonation Time. (4) Seven passages (all except Passage E) were equivalent in Vocal Intensity Variance.

AD-453 087 **Field 17B, 13H**
CFSTI Price: HC$1.00
Raytheon Co., Waltham, Mass.
FINE GRAIN DENSE FERRITES.
Quarterly rept. no. 1, Jul 30-Sep 64,
by A. E. Paladino, J. S. Waugh, and J. Green. Sep 64, 25p Rept. no. 5
Contract DA-28-043-AMC-00178 (E)
Proj. DA-1C0-24401-A-112

Descriptors: (*Ferrites, Nickel compounds), Cobalt compounds, Grain structures (Metallurgy), Phase studies, Microwave equipment, Dielectrics, Magnetic properties, Powder metallurgy, Flame spraying, Sintering, Particle size, Ball mills.

Identifiers: Hot pressing.

Fine-grained ferrites of cobalt substituted nickel ferrite (NIL-XCOXFE204) were hot pressed using powders prepared by flame spraying and

ball-milling. An oxygen anneal of the powder prior to hot pressing is an essential step required to reduce the dielectric loss. The hotpressing quality of the flame-sprayed powder was adversely affected by this procedure, whereas the ball-milled powders were not. Several dense samples have been prepared with loss tangents below 0.005, and measurements of threshold fields for subsidiary absorption have been made. A tentative dependence of H (CRIT) on grain size has been observed; and there is some indication that a two to fourfold increase in power handling capacity can be achieved with grain sizes of the order of one to two microns. (Author)

AD-458 873 **Field 17B, 13H**
CFSTI Price: HC$2.00
Raytheon Co., Waltham, Mass. Research Div.
FINE GRAIN DENSE FERRITES.
Quarterly rept. no. 2, 1 Oct-31 Dec 64,
by A. E. Paladino, J. S. Waugh, and J. Green. 31 Dec 64, 23p Rept. no. 6, S-725
Contract DA-28-043-AMC-00178 (E)
Proj. DA-1C024401A112

Descriptors: (*Ferrites, Material forming), Nickel compounds, Cobalt compounds, Iron compounds, Manganese compounds, Oxides, Density, Grain structures (Metallurgy), Microstructure, Dielectric properties, Magnetic properties, Microwaves, Heat treatment, X band, Magnetic materials, Powder metallurgy, Preparation.

Identifiers: Hot pressing.

A number of NI (1-X)COXFE2)4 and NI (1-X)MNXFE204 samples have been hot pressed using conventionally ball-milled powders. Densities in excess of 97% of theoretical values have been obtained together with X-band dielectric loss tangents below 0.001 and in most cases close to 0.0001. Low field magnetic losses at KU-band have been reduced almost an order of magnitude from previous levels, but are still two to four times greater than conventional nickel ferrite. There is some indication that these losses can be reduced by a heat treatment after hot pressing. Critical fields for subsidiary absorption as high as 95.0 OE have been obtained at KU-band on 2-4 micron grain size materials, with values more typically lying between 60 and 80 OE. This compares with a value of 16 OE on a conventional nickel ferrite at this frequency. Cobalt increases H sub crit by an amount greater than would have been expected from previous measurements made at X-band on saturation of the main resonance. (Author)

AD-464 540 **Field 17B**
CFSTI Price: HC$2.00
Raytheon Co., Waltham, Mass. Research Div.
FINE GRAIN DENSE FERRITES.
Quarterly rept. no. 3, 1 Jan-31 Mar 65,
by A. E. Paladino, J. S. Waugh, J. J. Green, J. Q. Owen, and A. E. Booth. 31 Mar 65, 36p Rept. no. 7, S-763
Contract DA-28-043-AMC-00178 (E)
Proj. DA-1C024401A112
See also AD-458 873.

Descriptors: (*Ferrites, Nickel compounds), Cobalt compounds, Grain structures (Metallurgy), Microwave equipment, Magnetic properties, Temperature, Heat treatment, Annealing.

Identifiers: Hot pressing.

A number of new compositions were prepared in the vicinity of the compensation point in the series Ni sub 1-xcoxfe204. No systematic variation in the threshold field or magnetic loss was observed with cobalt concentration, although threshold fields were as high as 108 OE at KU-band. Lowering the hot-pressing temperature from 1200 to 1150 C had no consistent effect on microwave properties. Annealing studies at 1200 and 1250 C indicate that the threshold field decreases significantly with time for nickel and nickelmanganese ferrites, whereas it remains high in nickel-cobalt ferrites. The magnetic loss in general decreases with increasing time; it decreases most for nickel and nickel-manganese ferrites, and least for nickel-cobalt ferrites. A satisfactory device geometry has been established for a differential phase-shift circulator, low power phase shift and insertion loss measurements have been made on a conventional and finegrain, nickel-cobalt ferrite. Although the insertion loss of the fine-grain ferrite is about double that of the conventional material due to a magnetic loss of approximately twice that of the conventional material, a circulator with less than or equal to 0.5 DB loss can be constructed. (Author)

AD-640 537 **Field 17B**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
THREE SIGNALING SYSTEMS FOR DOUBLE ACCESS TO AN ACTIVE SATELLITE.
Revised ed.,
by Frederick Jelinek. 19 Nov 65, 19p JA-2713
Contract AF 19 (628)-5167
ESD-TR-66-381
Revision of manuscript submitted 13 May 65. Supported in part by NSF. Prepared in cooperation with Cornell Univ., Ithaca, N. Y. Presented at the IEEE International Convention (1965), New York, N. Y.
Availability: Published in IEEE Transactions on Communications Technology vCOM-14 n2 p140-57 Apr 1966.

Descriptors: (*Communication satellites (Active), *Space communication systems), Digital systems, Signal-to-noise ratio, Effectiveness.

An active satellite is modeled as a repeater with a summer at its input and with a constant power output. The effectiveness of the following digital communication strategies for a constant bandwidth are compared in terms of R sub comp of the resulting channel: (1) 'time pulsing,' (2) 'frequency division,' and (3) 'CW signaling,' where both transmitters simultaneously use the entire bandwidth while transmitting not necessarily synchronized or equal power signals, which are chosen from the same M-ary alphabet and have identical duration. R sub comp formulas are obtained, and parametric families of their curves are given. Among others, the following conclusions may be drawn: (1) For sufficiently high signal-to-noise ratios, CW signaling is best, the potential improvement increasing with increasing alphabet size. (2) Noncoincidence of time intervals of the two transmitters improves the performance of CW signaling. (Author)

AD-640 571 **Field 17B, 5E, 5H, 6P K**
CFSTI Prices: HC$3.00 MF$0.75
Mitre Corp., Bedford, Mass.
DESIGN PROBLEMS IN VISUAL DISPLAYS. PART II. FACTORS IN THE LEGIBILITY OF TELEVISED DISPLAYS,
by D. A. Shurtleff. Sep 66, 72p MTR-203-Pt-2
Contract AF 19 (628)-5165
Proj. AF-7030
ESD-TR-66-299-Pt-2

Descriptors: (*Television display systems, *Visual perception), Design, Man-machine systems, Resolution, Bandwidth.

Identifiers: Legibility.

The literature on the legibility of numerals, capital letters, and words on television displays, dating from the late 1940s to the present, is evaluated. Selected studies of such factors as vertical resolution, video bandwidth, and direction of scanning are reviewed in detail. Conclusions are drawn, and recommendations are made for display design and applications. (Author)

AD-640 735 **Field 17B**
CFSTI Prices: HC$3.00 MF$0.75
Cruft Lab., Harvard Univ., Cambridge, Mass.
AN OPTIMUM PULSE AMPLITUDE MODULATION SYSTEM.
Technical rept.,
by David A. Shnidman. Mar 66, 78p TR-495
Contract Nonr-1866 (16)
Proj. NR-372-012

Descriptors: (*Pulse amplitude modulation, Data transmission systems), Mathematical models, Optimization, Signals.

The optimum (minimum mean square error) linear receiver and transmitter waveform has been jointly determined. The performance of this system is compared with that of the matched filter and the optimum constrained receiver on both a mean square error (MSE) and probability of error (PE) basis. Using the optimum MSE system, performance curves for uncorrelated message sequences are compared with those of correlated sequences. These performance curves are graphs of MSE and PE versus signal to noise (S/N) ratio. Approximating the intersymbol interference distribution with a Gaussian distribution gives PE within a few percent of the exact value. It is found that, for sequences with the same information rate, the correlated sequences have smaller error at low S/N, but at high S/N, the reverse is true. Results are obtained which indicate that, in the absence of accurate information about the message correlation, it is best to design the receiver for an uncorrelated message sequence. The signal energy required to maintain a PE of 0.000001 versus data rate, 1/T, is presented for 2,3, and 4 level data. Finally, it is shown that a channel with colored noise of spectral density N (f) = a + b numerical value of H (f) to the 2nd power where H (f) is the frequency response of the channel, has the same performance as a channel with white noise with spectral density N (f) = a + b and an appropriately chosen channel frequency response function. (Author)

AD-640 808 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
A NOMOGRAM FOR A SINGLE-PATH LINE-OF-SIGHT RADIO LINK FOR THE FREQUENCY RANGE 100 Mc/s TO 100 Gc/s.
Technical rept.,
by G. May. Mar 66, 8p TR-66091

Descriptors: (*Data transmission systems, Nomographs), Great Britain, Very high frequency, Ultrahigh frequency, Microwave frequency, Signal-to-noise ratio.

A nomogram is presented which enables one to calculate the signal-to-noise ratio for a given set of parameters on a single path line-of-sight radio link. The method of constructing the nomogram is briefly described and an example of its use is given. (Author)

AD-640 813 **Field 17B, 20N**
CFSTI Prices: HC$3.00 MF$0.50
Columbia Univ., New York. Dept. of Electrical Engineering.
SURFACE WAVE GUIDING AND RADIATING SYSTEMS.
Final rept., Mar 63-Feb 66,
by S. P. Schlesinger. Jun 66, 51p Scientific-95
Contract AF-19 (628)-2461
Proj. AF-4600
Task 460004
AFCRL-66-482

Descriptors: (*Radio transmission, Scientific research), Perturbation theory, Partial differential equations, Antenna arrays, Scanning, Ferroelectric materials, Plasma physics, Acoustics, Radiometers, Microwaves, Scattering, Plasma medium, Wave transmission.

A summary of research is presented. The following topics are discussed: Perturbation theories for nonuniform electromagnetic structures; Formal

solution to Maxwell's equations in general linear media: Dispersion relations for general electromagnetic propagation and radiating structures: Transmission and radiating properties of cylindrical surface wave structures: Ferroelectrics at microwave frequencies: Parameter space mapping of guided electromagnetic waves on plasma columns: Perturbations of homogeneous plasma columns: Observation of non-quasistatic plasma surface waves: Wave propagation along warm plasma columns: Correlation radiometry: and Combination scattering in magnetized plasma. (Author)

AD-640 836 **Field 17B, 9B**
CFSTI Prices: HC$4.00 MF$1.00
Stanford Univ., Calif. Dept. of Computer Science.
AN APPROACH TO COMPUTER SPEECH RECOGNITION BY DIRECT ANALYSIS OF THE SPEECH WAVE.
Technical rept.,
by Dabbala Rajagopal Reddy. 1 Sep 66, 148p CS-49, AI Memo-43

Descriptors: (*Speech recognition, Computers), Sound, Man-machine systems, Speech, Communication systems, Pitch discrimination, Phonetics, Input-output devices, Humans.

CONTENTS: Speech analysis: Design of a man-machine communication system for speech research: Segmentation, pitch detection and parameter determination: Classification of speech sounds: Results: Conclusions.

AD-640 862 **Field 17B, 4A**
CFSTI Prices: HC$3.00 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
A RADIO FREQUENCY SECTION FOR A THREE-FREQUENCY DISPERSIVE DOPPLER RECEIVER.
Memorandum rept.,
by Harold Raub. Jun 66, 70p BRL-MR-1756
Proj. RDT/E-1L013001A91A

Descriptors: (*Radio receivers, Doppler effect), (*Atmospheric sounding, Radio receivers), Preamplifiers, Intermediate frequency amplifiers, Crystal filters, Frequency multiplier, Very high frequency, Design, Ultrahigh frequency, Radiofrequency amplifiers, Circuits.

The Radio Frequency (RF) portion of a radio receiver system designed, developed and constructed for use in upper atmosphere research is discussed. This receiver system, which is a double-super-heterodyne type, is used to supply data relative to dispersive Doppler, spin and Faraday rotation, and propagation attenuation. The function of the RF section, design criteria, approaches to the design, problems, and techniques used in overcoming the problems are discussed in detail. (Author)

AD-640 931 **Field 17B, 9E**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
WIDE DYNAMIC RANGE VHF PRESELECTOR.
Technical rept.,
by Joseph M. Giannotto, and Eugene J. Chabak.
Sep 66, 38p ECOM-2756
Proj. 1P6-22001-A-057
Task 1P6-22001-A-057-05
See also AD-614 027.

Descriptors: (*Radio receivers, *Parametric amplifiers), Very high frequency, Frequency converters, Pumping (Electronics), Tuning devices, Band-pass filters, Intermediate frequency amplifiers, Crystal filters, Modulation, Noise (Radio).

Simultaneous operation of a transmitter and receiving device in close proximity to each other results in receiver desensitization and distortion due to cross-modulation effects. Utilization of parametric conversion techniques now provides the design engineer with a frequency converter which is considerably more amplitude-linear than conventional devices, with the added features of low noise characteristics and wide dynamic range capability. This report presents a development concerning the design and performance of a tunable parametric preselector operable over the range of 30-70 MHz. Also presented is a discussion of the ramifications of selecting the specific circuitry and parts. (Author)

AD-640 942 **Field 17B, 20N**
CFSTI Prices: HC$6.00 MF$1.25
Rome Air Development Center, Griffiss AFB, N. Y.
SUPPORT TO DCA TROPOSPHERIC SCATTER TESTS.
Final rept., Oct-Dec 65,
by Olindo A. Tagliaferri. Oct 66, 207p RADC-TR-66-609

Descriptors: (*Radio transmission, Troposphere), (*Troposphere, Scattering), Tests, Meteorological parameters, Radio communication systems.

Identifiers: Troposcatter communication systems.

An experimental investigation was conducted in the Caribbean area to relate measured meteorological parameters with ground-to-ground radio signal characteristics. The ground-to-ground link was the 614 km. overwater path between Grand Turk, British West Indies, and East Island, Puerto Rico, using AN/MRC-98 Radio Sets. Meteorological measurements were made from sea level to an altitude of 17 km and covered the areas along the ground-to-ground propagation path, off-axis to this path, and in the vicinity of the ground stations. The airborne measurements were performed by four specially equipped METEOROLOGICAL and MARCOM (Microwave-Airborne-Relay Comm) aircraft. Ground measurements were performed in the vicinity of the troposcatter terminals by specially equipped meteorological poles. (Author)

AD-640 994 **Field 17B**
CFSTI Prices: HC$4.00 MF$1.00
Vitro Labs., West Orange, N. J.
DEVELOPMENT OF DIGITAL COMMUNICATION EQUIPMENT TEST SET AN/GYM-4 ( ).
Rept. no. 6, Jul 64-Oct 66 (Final),
by S. I. Finkel, and D. J. Walker. Oct 66, 124p VL-2378-6-0
Contract DA-28-043-AMC-00327 (E)
Proj. DA-1E6-41209-D536
Task 1E6-41209-D536-02
ECOM-00327-F

Descriptors: (*Test sets, *Communication equipment), (*Digital systems, Communication equipment), Design.

Identifiers: AN/GYM-4 ( ).

Test Pattern Generator SG-600 ( )/GYM-4 and Digital Signal Analyzer TS-2129 ( )/GYM-4 were developed and designed in accordance with Electronics Command Technical Requirement SCL-7744B. Two models were fabricated and subjected to performance and environmental tests. Four additional models were then fabricated and performance tested. Several mechanical and electrical deficiencies were encountered during environmental tests. After minor modifications were made, all specification requirements were satisfied. The equipment was fully documented. This includes manufacturing drawings, photographs, repair parts lists, and operating and maintenance manuals. (Author)

AD-641 003 **Field 17B, 9D**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE PERFORMANCE OF SEQUENTIAL DECODING IN CONJUNCTION WITH EFFICIENT MODULATION.
Revised ed.,
by K. L. Jordan Jr. 30 Dec 65, 16p JA-2666
Contract AF 19 (628)-5167
ESD-TR-66-420
Revision of manuscript submitted 22 Sep 65.
Availability: Published in IEEE Transactions on Communication Technology vCOM14 n3 p283-97 Jun 1966.

Descriptors: (*Decoding, Modulation), (*Communication systems, Decoding), Information theory, Design, Performance (Engineering), Detection.

The design of a communications system consisting of a sequential encoder-decoder, working in conjunction with a modulation-detection system is considered from the point of view of high-information transmission efficiency. Emphasis is placed on M orthogonal signal modulation and a scheme known as list-of-l quantization. The results of a computer study of the computational behavior of the sequential decoder are described and used to predict buffer memory overflow probability. The described design procedure allows prediction of system performance to within a fraction of a decibel. A practical sequential decoder and a list-of-l modulation-detection system of reasonable complexity, can achieve performance on a white Gaussian channel to within 4.5 dB of the Shannon limit with coherent reception and to within 7 dB with incoherent reception. (Author)

AD-641 020 **Field 17B**
CFSTI Prices: HC$3.00 MF$0.75
Syracuse Univ. Research Corp., N. Y. Electronics Research Lab.
CALIBRATOR - SINGLE SIDEBAND ADAPTOR.
Final rept.,
by L. J. Paciorek, and C. D. Rasmussen. Jul 66, 59p
Contract Nonr-5020 (00)

Descriptors: (*Radio receivers, *Adaptive systems), (*Single sideband communication systems, Radio receivers), Calibration, High frequency, Mechanical drawings, Design, Demodulation.

The report discusses a one year effort concerned with providing the Zenith ZX-5 and other HF band receivers with a Single Sideband (SSB) reception capability. Contained is information concerning design, development, evaluation and construction of thirty (30) model E-130, Calibration - SSB Adaptors provided for this purpose. All associated electrical and mechanical drawings and a complete E-130 Operating and Maintenance Manual are also included. In the SSB mode the E-130 adaptor produces a carrier (1.6 - 25 MHz) that can be injected into the receiver's antenna terminal along with the sideband signal thus providing a means of demodulating SSB signals. Also provided in the small (48 cubic inches) battery operated adaptor is a 500 kHz crystal oscillator and harmonic generator providing crystal harmonics for receiver dial calibration from 1 to 25 MHz. Both adaptor functions can be utilized without receiver modification. (Author)

AD-75348 **Field 17B, 5I, 13J**
CFSTI Price: HC$4.60
Purdue Univ., Lafayette, Ind.
A FIELD STUDY OF VOICE COMMUNICATION PROBLEMS AS RELATED TO TRAINING DEVICES, PROCEDURE AND EQUIPMENT.
Technical rept.,
by J. W. Asher, T. D. Hanley, and M. D. Steer.
13 Apr 55, 49p
Contract N6ori-104 (02)
Proj. SPECDEVCEN-20-F-8
SPECDEVCEN-104-241, PB-118 851

Descriptors: (*Voice communication systems, *Naval training), (*Naval vessels (Combatant), Voice communication systems), Naval operations, Naval personnel, Officer personnel, Effectiveness, Training devices.

A survey of Naval personnel charged with communications duties was undertaken. Three broad categories of respondents were interviewed, namely, Senior Officers, Communications Officers, and enlisted personnel. Realizing the importance of the problem, high-level personnel gave full cooperation to the accomplishment of this investigation. Both the Officer and enlisted groups were quite consistent in pointing out problem areas in voice communications. The responses were generally related to four critical areas in which the major sources of difficulty can be summarized in terms of: inadequate training, unstandardized communications procedures, inefficient use of equipment and lack of proper supervision.

AD-78 536 **Field 17B, 13J**
CFSTI Price: HC$3.60
Purdue Univ., Lafayette, Ind.
A STUDY OF TYPE AND FREQUENCY OF COMMUNICATION MESSAGES ABOARD NAVAL VESSELS.
Technical rept.,
by L. Doty, T. D. Hanley, and M. D. Steer. 13 Apr 55, 38p
Contract N6ori-104 (02)
Proj. SPECDEVCEN-20-F-8
SPECDEVCEN-104-2-42, PB-123 753

Descriptors: (*Voice communication systems, *Naval vessels (Combatant)), Naval operations, Effectiveness, Naval personnel.

To determine the efficiency of voice communications systems aboard Naval vessels, recordings of messages transmitted during actual Naval operations were analyzed. The frequency of occurrence of various types of messages was tallied and the relative contribution of each message in terms of the information transmitted was determined. Analysis of complete and representative transcriptions aboard Naval vessels indicated that approximately 30 percent of the total number of messages in the sample contain information which does not contribute to the efficiency of Naval operations. Probably more important is the fact that these messages are actually interfering with communications by making the channels unavailable for essential messages. The results of the present study suggest that marked increases in the efficiency of voice communications may be obtained from the following: (1) More extensive training in current voice communications techniques prior to individual assignment. Particular emphasis should be placed upon the critical importance of circuit discipline. (2) More intensive training for those whose billet will involve voice communications duties. (3) Frequent monitoring of communications circuits as a technique for evaluating current communications practices.

AD-95 052 **Field 17B, 5I, 13J**
CFSTI Price: HC$2.60
Purdue Univ., Lafayette, Ind.
FUNCTIONAL SPECIFICATIONS FOR A VOICE COMMUNICATIONS TRAINING DEVICE.
Technical rept.,
by T. D. Hanley, and M. D. Steer. 10 Feb 56, 28p
Contract N6ori-104 (02)
SPECDEVCEN-104-2-45 PB-125 913

Descriptors: (*Voice communication systems, Training devices), (*Naval training, Voice communication systems), Instructors, Specifications, Speech, Intelligibility, Recording systems, Signal-to-noise ratio, Teaching methods, Naval personnel.

The study was undertaken to examine those variables which contribute to optimum speech intelligibility and to prescribe the functional characteristics which should be incorporated into a voice communications training device. Based on pertinent voice communications studies and on investigations specifically designed to yield additional information on the problem, functional specifications for a voice communications training device have been formulated. It was concluded that the device should include three basic components, namely, (1) a tape loop recorder-reproducer, (2) a signal/noise meter, and (3) a rate meter. A description of this device as well as recommendations for its utilization are given.

N66-30305 **Field 17B**
CFSTI Prices HC$4.00 MF$0.75
Raytheon Co., Sudbury, Mass. Space And Information Systems Div.
MILLIMETER COMMUNICATION PROPAGATION PROGRAM, VOLUME III FINAL REPORT, 1 NOV. 1964 - 1 NOV. 1965.
1966, 104p NASA-CR-76131, FR-65-334-3
Contract NAS5-9523

Descriptors: *Bibliography, *Millimeter wave, *Space communication, *Wave propagation, Abstract, Annotation, Antenna, Atmospheric, Channel, Characteristics, Circuit, Communication, Component, Earth, Effect, Meteorology, Millimeter, Performance, Plasma, Propagation, Space, Wave.

For abstract, see STAR 04 17.

N66-30348 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SUGGESTED FREQUENCY RANGES FOR SPACE MISSIONS.
by P. E. Schmid. 1 Mar 66, 33p NASA-TM-X-55525, X-507-66-169

Descriptors: *Capsule, *Communication system, *Radio frequency, *Space mission, Antenna, Attenuation, Communication, Earth, Frequency, Galaxy, Mission, Noise, Parameter, Radio, Space, Spacecraft, System.

For abstract, see STAR 04 17.

N66-30350 **Field 17B**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OPTICAL AND MICROWAVE COMMUNICATIONS - A COMPARISON.
by F. Kalil. Mar 66, 73p NASA-TM-X-55527, X-507-66-173

Descriptors: *Microwave, *Millimeter wave, *Optical tracking, *Spacecraft communications system, Communication, Mars, Millimeter, Noise, Optical, Quantum, Radio, S-band, Sky, Spacecraft, Spectrum, System, Thermal, Tracking, Wave.

For abstract, see STAR 04 17.

N66-30356 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administraion. Goddard Space Flight Center, Greenbelt, Md.
APOLLO PLASMA SHEATH IN-FLIGHT DIAGNOSTICS.
by B. Rosenbaum. 5 Apr 66, 42p NASA-TM-X-55533; X-507-66-203

Descriptors: *Blackout, *Electron density, *Plasma sheath, Apollo project, Communications, Density, Diagnostics, Electron, Flow, Observation, Plasma, Radio, Reentry, Sheath, Signal, Supersonic.

For abstract, see STAR 04 17.

N66-30529 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
Philco Corp., Blue Bell, Pa. Communications And Electronics Div.
RESEARCH AND DEVELOPMENT OF AN OPTIMIZED LABORATORY SPEECH-COMPRESSION SYSTEM FOR SPACECRAFT APPLICATION. TASK 7- MICROMINIATURIZATION STUDY.
by D. M. Jurenko, and J. M. Loe. 25 May 66, 35p NASA-CR-65424
Contract NAS9-4523

Descriptors: *Microminiaturization, *Spacecraft communications system, *Speech, Bandpass, Communications, Compression, Design, Feasibility, Film, Filter, Generator, Metal, Microcircuit, Oxide, Pitch, Semiconductor, Silicon, Solid, Spacecraft, State, Synthesizer, System, Thickness, Thin.

For abstract, see STAR 04 17.

N66-30538 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
Philco Corp., Blue Bell, Pa. Communications And Electronics Div.
RESEARCH AND DEVELOPMENT OF AN OPTIMIZED LABORATORY SPEECH COMPRESSION SYSTEM FOR SPACECRAFT APPLICATION. TASK 6 - SPACE MISSION APPLICATIONS STUDY.
by D. M. Jurenko, and C. F. Teacher. 25 May 66, 30p NASA-CR-65423
Contract NAS9-4523

Descriptors: *Bandwidth, *Noise, *Space mission, *Spacecraft communications system, *Speech discrimination, Characteristics, Communications, Compression, Cosmic, Discrimination, Lunar, Mission, Narrow, Processing, Solar, Source, Space, Spacecraft, Speech, System.

For abstract, see STAR 04 17.

N66-30543 **Field 17B**
CFSTI Prices HC$4.00 MF$1.00
Philco Corp., Blue Bell, Pa. Communications And Electronics Div.
RESEARCH AND DEVELOPMENT OF AN OPTIMIZED LABORATORY SPEECH-COMPRESSION SYSTEM FOR SPACECRAFT APPLICATION FINAL REPORT, 25 MAY 1965 - 25 MAY 1966.
by D. M. Jurenko, J. M. Loe, and J. P. Schultz. 25 May 66, 125p NASA-CR-65425
Contract NAS9-4523

Descriptors: *Spacecraft communications system, *Speech, Band, Bandwidth, Breadboard, Channel, Circuit, Communications, Compression, Design, Filter, Information, Microphone, Multiplex, Narrow, Rate, Spacecraft, Synthesizer, System, Transmission.

For abstract, see STAR 04 17.

N66-31213 **Field 17B**
CFSTI Prices HC$4.00 MF$0.75
Collins Radio Co., Cedar Rapids, Iowa.
SIGNAL FADING CHARACTERISTICS, ECHO II.
Jul 66, 108p NASA-CR-528
Contract NAS5-9648

Descriptors: *Communication system, *Echo ii satellite, *Probability distribution, *Signal fading, Analysis, Characteristics, Communication, Computation, Cross section, Data, Density, Digital, Distribution, Duration, Echo, Effect, Fading, Function, Instrumentation, Period, Probability, Range, Reduction, Removal, Signal, System.

For abstract, see STAR 04 17.

N66-31825 **Field 17B**
CFSTI Prices HC$7.39 MF$3.25
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME V - SUBSYSTEM AND TECHNICAL ANALYSES.

BOOK 3 - TELECOMMUNICATIONS, RADAR SYSTEMS AND POWER FINAL REPORT.
by J. J. Mahoney. 11 May 66, 689p NASA-CR-66137, AVSSD-0006-66-RR, VOL. V, BK-3
Contract NAS1-5224

Descriptors: *Mars probe, *Power supply, *Radar system, *Telecommunication, Altitude, Atmospheric, Battery, Cell, Design, Entry, Fuel, Mars, Orbit, Planet, Power, Probe, Radar, Subsystem, Supply, System, Telemetry, Trajectory.

For abstract, see STAR 04 17.

N66-32125 **Field 17B**
CFSTI Prices HC$3.25 MF$1.25
Atlantic Research Corp., Alexandria, Va. Jansky And Bailey Systems Engineering Dept.
TECHNICAL AND COST FACTORS THAT AFFECT TELEVISION RECEPTION FROM A SYNCHRONOUS SATELLITE FINAL REPORT.
30 Jun 66, 189p NASA-CR-76601, TR-PL-9037
Contract NASW-1305

Descriptors: *Cost estimate, *Satellite television, *Television transmission, Antenna, Attenuation, Computer, Cost, Environment, Estimate, Feed, Frequency, Gain, Hardware, Loss, Model, Modulation, Program, Reception, Satellite, Synchronous, System, Technology, Television, Transmission, Very high, Video.

For abstract, see STAR 04 17.

N66-32625 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
Electro-voice, Inc., Buchanan, Mich. Engineering Dept.
HEADSET ASSEMBLIES FINAL REPORT.
by R. C. Ramsey. 1966, 34p NASA-CR-65430
Contract NAS9-5155

Descriptors: *Astronaut, *Hearing, *Helmet, *Space communication, Amplifier, Assembly, Communication, Design, Ear, Electronics, Headset, Microphone, Performance, Protection, Space.

For abstract, see STAR 04 17.

N66-36855 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
GROUND INSTRUMENTATION FOR MARINER IV OCCULTATION EXPERIMENT.
by G. S. Levy, T. Y. Otoshi, and B. L. Seidel. 15 Sep 66, 32p NASA-CR-78051, JPL-TR-32-984
Contract NAS7-100

Descriptors: *Deep space instrumentation facility (dsif), *Ground station, *Mariner iv space probe, *Occultation, Change, Deep, Dsif, Experiment, Facility, Frequency, Ground, Instrumentation, Radio, Receiver, Space, Spacecraft, Station, Support, System.

For abstract, see STAR 04 22.

N66-37290 **Field 17B**
CFSTI Prices HC$3.75 MF$1.50
Electro-mechanical Research, Inc., Sarasota, Fla.
MANNED SPACECRAFT ADVANCED DIGITAL TELEVISION COMPRESSION STUDY. VOLUME 1 - TEXT FINAL REPORT.
26 Apr 65, 287p NASA-CR-65508
Contract NAS9-3429

Descriptors: *Digital spacecraft television, *Manned spacecraft, Channel, Color, Communication, Compression, Digital, Electrostatic, Equipment, Manned, Spacecraft, Telemetry, Television, Transmission, Vidicon.

For abstract, see STAR 04 22.

N66-37291 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
Electro-mechanical Research, Inc., Sarasota, Fla.
MANNED SPACECRAFT ADVANCED DIGITAL TELEVISION COMPRESSION STUDY. VOLUME 2 - PHOTOGRAPHS FINAL REPORT.
26 Apr 65, 38p NASA-CR-65507
Contract NAS9-3429

Descriptors: *Digital spacecraft television, *Manned spacecraft, *Photograph, Compression, Digital, Display, Manned, Spacecraft, Television.

For abstract, see STAR 04 22.

AD-640 930 **See Field 9D**

AD-641 132 **See Field 9D**

AD-641 248 **See Field 9D**

AD-641 266 **See Field 9D**

17E. INFRARED AND ULTRAVIOLET DETECTION

AD-444 180 **Field 17E, 20F**
CFSTI Price: HC$2.60
Naval Ordnance Lab., Corona, Calif.
PROPERTIES OF PHOTODETECTORS, PHOTODETECTOR SERIES, 61ST REPORT.
Rept. for Sep 63-Apr 64,
by A. B. Naugle, J. D. Merriam, and W. L. Eisenman. 1 Jun 64, 28p NOLC-602

Descriptors: (*Infrared detectors, Electrical properties), (*Infrared photoconductors, Electrical properties), Blackbody radiation, Lead compounds, Sulfides, Indium compounds, Antimony alloys, Germanium.

This report presents the results of measurements made on ten photodetectors. It includes data sheets on lead sulfide cells, germanium cells and a thermocouple. (Author)

N66-30289 **Field 17E**
CFSTI Prices HC$4.00 MF$0.75
Westinghouse Electric Corp., Baltimore, Md. Aerospace Div.
INFRARED SENSOR FOR APOLLO REENTRY FINAL REPORT, 1 JUL. - 30 DEC. 1964.
1965, 113p NASA-CR-62570
Contract NAS5-9703

Descriptors: *Apollo project, *Infrared tracking, *Radio frequency, *Reentry vehicle, *Spacecraft sensor, Angle, Atmosphere, Blackout, Detection, Earth, Frequency, Infrared, Radiation, Radio, Reentry, Sensor, Spacecraft, System, Tracking, Vehicle.

For abstract, see STAR 04 17.

N66-37146 **Field 17E**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
APOLLO INFRARED ACQUISITION AND TRACKING SYSTEM.
by H. L. Richard. Oct 66, 64p NASA-TN-D-3362

Descriptors: *Apollo spacecraft, *Infrared detector, *Reentry vehicle, *Tracking system, Acquisition, Aerodynamic, Airborne, Atmospheric, Background, Design, Detector, Heating, Infrared, Radiation, Reentry, System, Tracking, Transmission, Vehicle.

For abstract, see STAR 04 22.

AD-641 032 **See Field 20F**

N66-37470 **See Field 3B**

17G. NAVIGATION AND GUIDANCE

AD-237 155 **Field 17G, 1B, 15G**
CFSTI Price: HC$3.60
RAND Corp., Santa Monica, Calif.
THE FLIGHT OPERATIONS PLANNER: ADDENDUM TO RM-2415.
Research memo.,
by W. M. Jones, and M. B. Shapiro. 9 Feb 60, 29p RM-2525
Contract AF 49 (638)-700
See also AD-227 738.

Descriptors: (*Air force operations, Flight), (*Jet bombers, Air force operations), (*Jet fighters, Air force operations), Digital computers, Transport planes, Refueling.

The Flight Operations Planner (FLIOP) provides information about course and distance from a known point and hence allows the user to designate en-route points. A change in the method of determining winds was made that results in a more accurate approximation of the effect of the aircraft's motion on the standard vector deviation quantities used. (Author)

AD-640 601 **Field 17G, 1B**
CFSTI Prices: HC$4.00 MF$0.75
Pan American World Airways, Inc., New York.
EVALUATION OF INERTIAL NAVIGATION SYSTEM IN CIVIL AIR TRANSPORT OPERATIONS. VOLUME III. OPERATIONAL EVALUATION.
Final rept.,
by P. R. J. Reynolds, M. W. Eldred, and W. W. Moss. 15 Jun 66, 119p
Contract FA 64WA-5192
Proj. 350-101-01N
SRDS-RD-66-30-Vol-3

Descriptors: (*Inertial navigation, *Jet transport planes), (*Civil aviation, Operations research), Tests, Navigation computers, Instrumentation.

Aircraft installation of an LN-12 Inertial Navigation System is described. Inflight data-collection methods are described. Ground support experience is itemized. Observed error data are plotted. (Author)

AD-640 604 **Field 17G, 1B**
CFSTI Prices: HC$3.00 MF$0.50
Lockheed-Georgia Co., Marietta.
DEVELOPMENT OF ALL WEATHER LANDING SYSTEM RELIABILITY ANALYSIS AND CRITERIA FOR CATEGORY III GROUND SYSTEMS. PHASE 2, VOLUME 1.
Summary rept.,
by L. A. Adkins, M. C. Thatro, and L. D. Schiller. Aug 66, 54p ER-8541-Vol-1
Contract FA-65-WA-1376
Proj. 320-207-01N
SRDS-RD-66-43-Vol-1

Descriptors: (*Instrument landings, All-weather aviation), Reliability, Cost effectiveness, Aviation safety.

The report represents the conclusions, recommendations and selected data from the five month study program on the proposed Category III ILS ground system. The primary program effort was directed to the evaluation and adequacy of reliability, availability, safety, cost effectiveness, redundancy and monitoring. Included in the report is the format and summary of several computer programs utilizing a basic reliability model of the complete ground system. From these programs data was generated to depict the effect of various levels of redundancy and component reliability on system reliability and availability. Data are also presented to depict the combined effect of mean time between failure and mean time to restore on availability, and the resulting impact on maintenance

requirements. The potential cost increments incurred from loss of availability as a result of various levels of unreliability, in terms of maintenance and user loss, is presented for several levels of ILS weather conditions. A proposed program is detailed for the inclusion of guaranteed reliability requirements in the procurement of ILS ground system components. (Author)

AD-640 605 Field 17G, 1B
CFSTI Prices: HC$6.00 MF$1.25
Lockheed-Georgia Co., Marietta.
DEVELOPMENT OF ALL WEATHER LANDING SYSTEMS RELIABILITY ANALYSIS AND CRITERIA FOR CATEGORY III GROUND SYSTEMS. PHASE 2, VOLUME 2,
by L. A. Adkins, M. C. Thatro, and L. D. Schiller. Aug 66, 241p ER-8541-Vol-2
Contract FA-65WA-1376
Proj. FAA-320-207-01N
SRDS-RD-66-43-Vol-2
See also AD-640 604.

Descriptors: (*Instrument landings, All-weather aviation), Reliability, Cost effectiveness, Aviation safety.

The report presents the results of a five-month study program on the proposed Category III ILS ground system. The primary program effort was directed to the evaluation and adequacy of Reliability, Availability, Safety, Cost Effectiveness, Redundancy and Monitoring. Included in the report is the format and summary of several computer programs utilizing a basic reliability model of the complete ground system. From these programs data was generated to depict the effect of various levels of redundancy and component reliability on system reliability and availability. Data is also presented to depict the combined effect of Mean-Time-Between-Failure and Mean-Time-to-Restore on availability and the resulting impact on maintenance requirements. The potential cost increments incurred from loss of Availability as a result of various levels of unreliability in terms of maintenance and user loss is presented for several levels of ILS weather conditions. A proposed program is included for the inclusion of guaranteed reliability requirements in the procurement of ILS ground system somponents. (Author)

AD-640 818 Field 17G, 22A, 22B
Not available from CFSTI.
Massachusetts Inst. of Tech., Cambridge.
SPACE NAVIGATION GUIDANCE AND CONTROL,
by C. S. Draper, W. Wrigley, D. G. Hoag, R. H. Battin, and J. E. Miller. 1965, 383p
Contracts NAS9-153, NAS9-4065
AGARD-ograph-105
Availability: Technivision Limited, Maidenhead, England. HC$15.50.

Descriptors: (*Space navigation, Control systems), Guidance, Gyroscopes, Manned spacecraft, Lunar surface vehicles, Inertial guidance, Midcourse guidance, Instrumentation, Safety, Spacecraft, Accelerometers, Optical equipment, Ground support equipment, Computers.

Identifiers: Apollo.

Contents: Navigation, guidance and control of a manned lunar landing; explicit and unified methods of spacecraft guidance; Inertial measurement units and pulse torquing; Optical measurements and navigation phenomena; Guidance computer design; Space vehicle control systems.

AD-640 837 Field 17G, 14D
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aero Mechanics Dept.
INVESTIGATION OF THE INTERFACE BETWEEN THE AN/APX-64 (V) TRANSPONDS SET (MODE C) AND ENCODERS USED FOR ALTITUDE REPORTING.
Final rept.,
by John P. McHale. 10 Oct 66, 21p NADC-AM-6654

Descriptors: (*Transponders, Coding), Compatibility, Altitude, Performance (Engineering).

Identifiers: AN/APX-64.

The report presents the results of a laboratory investigation of the interface between an AN/APX-64 (V) Transponder Set and encoders employed for automatic altitude reporting. (Author)

AD-641 282 Field 17G
CFSTI Prices: HC$4.00 MF$1.00
Bendix Corp., Teterboro, N. J. Eclipse-Pioneer Div.
EVALUATION OF INERTIAL NAVIGATION SYSTEM IN CIVIL AIR TRANSPORT OPERATIONS. VOLUME II. BANC-461 STEERING COMPUTER PERFORMANCE.
Final rept.,
by . R. Walcott, and John Kilmartin. 15 Jun 66, 142p Pub-7311-66-17R
Contract FA64WA-5208
Proj. FA-350-101-02N
SRDS-RD-66-30-Vol-2
See also AD-640 601.

Descriptors: (*Inertial navigation, Instrumentation), (*Commercial planes, Inertial navigation), (*Navigation computers, Steering), Automatic pilots, Transport planes, Performance (Engineering).

The report summarizes the work performed to evaluate the first autopilot coupled Inertial Navigation System installed in a commercial jet aircraft engaged in regular scheduled passenger operations. Contractual provisions are listed and reviewed. Modifications to the Bendix AN/ASN-46 Navigational Computer used in this program are recorded. Preflight test programs are described. Data taken during 185 flight legs of 43 flights is analyzed for BANC-461 Steering Computer Performance. Calculations are made of cross-track and along-track errors with respect to both the original flight plan and the actual coordinates used in setting up the flight legs. Predicted errors from an earlier report (RD-65-126 dated August 31, 1965) are compared with flight results. (Author)

AD-641 286 Field 17G, 1E
CFSTI Prices: HC$2.00 MF$0.50
Wilcox Electric Co., Inc., Kansas City, Mo.
DEVELOPMENT OF LINEAR GLIDE SLOPE FIELD DETECTOR FOR USE WITH CATEGORY I, II AND III LANDING SYSTEM MONITORS.
Final rept.,
by Brandon Reed. Apr 66, 27p
Contract FA65WA-1274
Proj. 320-101-01N
SRDS-RD-66-12

Descriptors: (*Glide path systems, *Detectors), (*Landing aids, *Terminal guidance), Monitors, Design, Linear systems, Reliability, Stability, Antennas.

The field detector consists of an antenna and mounting assembly and a detachable detector unit that can be used with any 50-ohm rf source of the correct magnitude and frequency. Design characteristics of the field detector permit compatible operation with the following landing system monitors: Wilcox CA-1363, Wilcox FA-5479X, and Litton CA-5010. (Author)

N66-30438 Field 17G
CFSTI Prices HC$3.00 MF$0.75
Hughes Research Labs., Malibu, Calif.
RESEARCH ON GRAVITATIONAL MASS SENSORS QUARTERLY PROGRESS REPORT NO. 1, 15 OCT. 1964 - 14 JAN. 1965.
by C. C. Bell, R. L. Forward, and J. R. Morris. 1965, 95p NASA-CR-67369
Contract NASW-1035

Descriptors: *Asteroid, *Deep space, *Gravity, *Lunar orbiter, *Mass distribution, *Measuring apparatus, *Moon, *Planetary mass, Apparatus, Deep, Distribution, Lunar, Mass, Measuring, Noise, Orbit, Planetary, Probe, Sensor, Space.

For abstract, see STAR 04 17.

N66-30526 Field 17G
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LINEAR FEEDBACK GUIDANCE.
by L. R. Dickey. 30 Nov 65, 60p NASA-TM-X-53362

Descriptors: *Closed loop system, *Feedback, *Guidance system, *Linear system, *Motion equation, Angle, Closed, Coefficient, Equation, Euler-lagrange equation, Gain, Guidance, Linear, Loop, Motion, Perturbation, Polynomial, Position, System, Thrust, Time, Velocity, Weighting.

For abstract, see STAR 04 17.

N66-32291 Field 17G
CFSTI Prices HC$2.00 MF$0.50
Tennessee Univ., Knoxville. Dept. Of Electrical Engineering.
METHODS FOR INJECTION ERROR ANALYSIS AND THEIR COMPARISON SCIENTIFIC REPORT NO. 13.
by J. C. Hung, and J. D. Irwin. 1 Aug 66, 33p
NASA-CR-76734
Grant NSG-351

Descriptors: *Error, *Injection, *Trajectory analysis, Adjoint, Analysis, Comparison, Control, Covariance, Direct, Gaussian distribution, Guidance, Linear, Malfunction, Matrix, Method, Random, Statistical, Trajectory, Vector.

For abstract, see STAR 04 17.

N66-32551 Field 17G
CFSTI Prices HC$2.50 MF$0.75
Army Map Service, Washington, D. C.
GEMINI CELESTIAL DISPLAY DEVICE STUDY.
1 Mar 65, 100p NASA-CR-65006

Descriptors: *Celestial navigation, *Display system, *Gemini spacecraft, *Star field, Attitude, Celestial, Comparator, Curve, Display, Field, Gemini, Geometry, Navigation, Orbit, Spacecraft, Star, System, Track, Visual, Window, Yaw.

For abstract, see STAR 04 17.

N66-32634 Field 17G
CFSTI Prices HC$2.50 MF$0.75
Purdue Univ., Lafayette, Ind. School Of Electrical Engineering.
INVESTIGATION OF OPTIMIZATION OF ATTITUDE CONTROL SYSTEMS SECOND ANNUAL REPORT, 15 SEP. 1965 - 30 JUN. 1966.
by J. Y. Luh. 1966, 99p NASA-CR-76956
Contracts NAS7-100, JPL-950670
Prepared For Jpl

Descriptors: *Antenna, *Control system, *Linear system, *Optimal control, *Stability and control, Attitude, Autonomy, Booster, Control, Controller, Direction, Effect, Launch vehicle, Linear, Optimal, Point, Probability, Stability, System, Wind.

For abstract, see STAR 04 17.

N66-37035 **Field 17G**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
INTERPLANETARY MIDCOURSE GUIDANCE USING RADAR TRACKING AND ON-BOARD OBSERVATION DATA.
by L. S. Cicolani. Sep 66, 55p NASA-TN-D-3623

Descriptors: *Interplanetary navigation, *Manned space flight, *Midcourse guidance, *Navigation and guidance, *Radar tracking, Guidance, Interplanetary, Manned, Mars, Midcourse, Mission, Navigation, Observation, Onboard, Performance, Radar, Simulation, Space flight, Theodolite, Tracking.

For abstract, see STAR 04 22.

PB-170 734 **Field 17G**
CFSTI Prices: HC$3.00 MF$0.75
Hazeltine Electronics Div., Hazeltine Corp., Little Neck, N. Y.
ALPHA NUMERIC SYMBOL GENERATION EQUIPMENT.
Final rept.,
by J. F. O'Connor. Sep 65, 92p
Contract FA-WA-4345
Projs. FA-121-321-01A, FA-122-321-01A
SRDS-RD-65-103

Descriptors: (*Air traffic control systems, *Television display systems), Design, Computer logic, Circuits, Radar beacons, Test methods.

Identifiers: Alpha-numeric symbols, ANG, ARTS, SPAN.

Hazeltine has developed and installed two Alpha Numeric Generator equipments in the FAA Atlanta and Indianapolis Air Traffic Control Centers. These equipments have passed all acceptance tests and are undergoing operation testing. These Alpha Numeric Generators electronically label aircraft radar blips on air traffic controller's displays with identity, altitude, vector, speed, and other data. The use of the Alpha Numeric Generators in the ARTS and SPAN air traffic control systems automates former manual functions of the controllers, reduces the necessary communications with aircraft pilots, and minimizes the possibilities of errors in air traffic control. A summary of development problems and test results on the Alpha Numeric Generators is given. (Author)

AD-640 606 **See Field 22C**

17H. OPTICAL DETECTION

AD-640 540 **Field 17H, 20E**
CFSTI Prices: HC$1.00 MF$0.50
Harry Diamond Labs., Washington, D. C.
GALLIUM ARSENIDE LASER RADAR-PRELIMINARY STUDIES,
by William L. Soper. Aug 66, 24p TM-66-13
Projs. DA-1A010501A015, HDL-36700

Descriptors: (*Gallium compounds, *Arsenides), (*Lasers, *Opdar), Model tests.

The report discusses preliminary work on room-temperature gallium arsenide laser radar and rangefinding. Experimental results are given for three different laboratory models using receivers of up to 20-in. diameter aperture under daylight conditions. (Author)

AD-641 274 **Field 17H, 8E**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
TEST RESULTS ON GYROTHEODOLITES,
by Yu. V. Sergovskii. Oct 66, 9p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-1M643315D578
TT-66-62539, ERDL-T-1874-66
Resultaty Issledovaniya Gidroteodolitov, trans. of Geodeziya i Kartografiya (USSR), n1 p17-20 1966.

Descriptors: (*Theodolites, Gyroscopes), USSR, Geodesics, Performance (Engineering), Tests.

Test operation of the instruments have shown that: (1) The Gi-Bl gyrotheodolites, which are produced in Hungary, provide for autonomous determination of the azimuths of orienting directions with a mean-square error of + 20 sec within 40-60 minutes. (2) The instrument is easy to handle and is simple to operate. The majority of the instruments function flawlessly and yields reliable results; however, some of them do not provide for stability of the constant correction of the instrument. Drawbacks in the design of the instruments are the lack of automatic tracking of the position of the resection points, as well as the long time (up to 90 minutes) required for the power pack to warm up when operating under low-temperature conditions. To date field tests on two experimental models of the Gi-B2 gyrotheodolite have been carried out. Out of 139 runs by these instruments, carried out over a period of 20 days at latitudes of 45-60 deg, the mean-square error in determining the direction from one run was equal to about + 10 sec. In the course of transporting the instrument about 3000 km by motor vehicle and about 2000 km in an aircraft, no changes were detected in the rated value of the constant correction. Chilling them twice to temperatures of -30 and -40C did not lead to a reduction in their operating precision. (Author)

N66-31868 **See Field 22C**

17I. RADAR DETECTION

AD-294 465 **Field 17I, 20I**
CFSTI Price: HC$6.60
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
RADAR ABSORPTION EFFECTS MEASURED IN A FLIGHT PHYSICS RANGE,
by H. M. Musal, Jr., P. E. Robillrd, and R. I. Primich. Dec 62, 70p Technical rept. TR-62-209B
Contract DA-04-495-ORD-3567, ARPA Order-347-62
Rept. on Hypervelocity Range Research Program.

Descriptors: (*Radar, *Hypersonic test vehicles), (*Doppler radar, Theory), Microwave equipment, Microwaves, Ionization, Calibration, Copper coatings, Radar analysis, Radar equipment, Radar reflections, Absorption, Plasma physics.

This report is part of a study of flow field observables associated with hypersonic velocity projectiles in free flight under controlled environmental conditions. For small projectiles it is possible to measure the wake ionization properties directly with available high frequency probes. This paper describes preliminary measurements that have been made of the head-on radar cross of both copper spheres and plastic cylinders with copper covered hemispherical noses. The conventional theoretical approach to radar absorption is outlined. The CW Doppler radars which operate at 35 and 70 Gc/s, their installation on the range, the method of operation and calibration, and the techniques of data reduction and analysis are discussed in some detail.

AD-444 070 **Field 17I**
CFSTI Price: HC$1.60
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
CW RADAR FOR MEASURING HEAD-ON RADAR CROSS SECTION OF FREE-FLIGHT PROJECTILES. I. ANTENNA FOR SIMULTANEOUS 35 AND 70Gc OPERATION,
by P. E. Robillard, and W. E. Blore. Jul 64, 13p
Contract technical note CTN64-01
Contract DA-04-495-ORD-3567 (Z), ARPA Order-357-63
Rept. on Proj. DEFENDER.

Descriptors: (*Radar antennas, Extremely high frequency), (*Radar echo areas, Measurement), (*Hypervelocity projectiles, Radar echo areas), Multiplex, Doppler radar, Absorption, Antenna radiation patterns, Horn antennas, Radar reflections.

A multiplex antenna was designed for the 35 Gc and 70 Gc radars. This antenna system was installed on the physics range to obtain simultaneous measurements of the nose-on radar cross section of hypersonic projectiles. The 35 Gc and 70 Gc CW Doppler radars were used alternately on the physics range to measure the nose-on radar cross section of projectiles. The absorption effect previously reported was measured with this instrumentation. Due to the high cost of firings, simultaneous operation of the two radars would be desirable. In addition, simultaneous observations were made on two separate firings. To measure nose-on radar cross section, the axis of the radar antenna beam must coincide with the flight axis of the projectile. To operate two radars simultaneously means that the two radar beams must be coaxial. Since CW systems were being used and are to be preferred for a variety of reasons, time sharing techniques were not considered. Therefore an antenna system had to be devised which would orient two CW beams coaxially with a minimum of interaction between the two systems. (Author)

AD-458 004 **Field 17I**
CFSTI Price: HC$2.60
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
DESIGN AND THEORETICAL PERFORMANCE OF REACTIVEWALL CORNER REFLECTORS.
Final technical rept.,
by E. M. Kennaugh, and C. Chung. 13 Jan 65, 22p
Rept. no. 1790-1
Contract NOw-64-0215

Descriptors: (*Radar corner reflectors, Design), Radar interference, Radar echo areas, Polarization, Theory, Performance (Engineering), Dielectric properties, Electrical properties, Radar clutter.

Within the limitations of available materials and a relatively simple design, it is possible to obtain adequate same-sense circularly polarized responses from conventional triple-bounce corner reflectors by modifying a single wall, minor reductions in coverage occur in one plane, but by proper mounting of the reflector no loss of performance should occur in normal use. The effect of minor variations in dimensions and electrical properties of layer materials should receive further study on an experimental basis. Theoretical calculations indicate such effects to be minor on the basis of assumed tolerances, but preliminary measurements (now in progress) indicate larger variations, possibly due to inhomogeneity, echo area patterns of production-type reflectors with and without dielectric wall modifications should be obtained and compared with calculated values. The effect of tolerances in wall angles, surface finish and irregular corner profile should be determined independently of the reactive wall modification. Possible losses in performance caused by water absorbed by or flowing over corner surfaces during flight use should be investigated theoretically and experimentally. (Author)

AD-640 577 **Field 17I**
CFSTI Prices: HC$1.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
COMPARISON OF REFLECTIVE PROPERTIES OF CORNER REFLECTOR CLUSTERS AND LUNEBURG LENS REFLECTORS.
Instrumentation papers,
by F. S. Holt. Aug 66, 22p AFCRL-IP-114, AFCRL-66-626
Proj. AF-4600
Task 460010

Descriptors: (*Radar reflectors, Effectiveness), Radar corner reflectors, Radar echo areas, Electromagnetic lenses.

The reflective properties of rectangular corner reflector clusters and Luneburg lens reflectors are analyzed, and the relative effectiveness and efficiency of these reflectors in producing large radar cross sections over a wide range of aspect angles is compared. The Luneburg lens reflector is found to be very effective and efficient, but is expensive, heavy, and difficult to repair. In contrast, the rectangular corner reflector cluster is inexpensive, repairable, and can be made lightweight, but is not an efficient reflector when used over wide ranges of aspect angles. (Author)

AD-640 587 **Field 17I, 9E**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
3-D RADAR BASED ON PHASE-IN-SPACE PRINCIPLE.
Instrumentation papers,
by William G. Mavroides, Lancer G. Dennett, and Leon S. Dorr. 15 Jul 65, 13p AFCRL-IP-113, AFCRL-66-611
Proj. AF-4600
Task 460010
Availability: Published in IEEE Transactions on Aerospace and Electronic Systems vAES2 n3 p323-31 May 1966.

Descriptors: (*Radar, *Phased arrays), Height finding, Radar antennas, Antenna radiation patterns, Radar scanning, Phase (Electronics).

A height-finding technique utilizing the relative phase between a series of point sources of a traveling-wave array is described. The point sources in the focal region of a torus antenna are used to control the phase of the antenna elevation pattern in space. Signals received from a given beam angle will arrive at each terminal of the traveling-wave feed with a different phase. By comparing this phase with a reference phase, the angular direction of an arriving plane wave can be measured with considerable accuracy. Thus a radar system with a single antenna and feed structure can be employed to yield instantaneous height coverage along with the usual range data. (Author)

AD-640 892 **Field 17I**
CFSTI Prices: HC$1.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
APPLICATION OF TRANSVERSAL EQUALIZER TO RADAR RECEIVER WITH EMPHASIS ON DOPPLER SENSITIVITY.
Technical rept.,
by R. C. Yost, and E. B. Smith. 23 Jun 66, 24p TR-420
Contract AF 19(628)-5167, ARPA Order-600
ESD-TR-66-243

Descriptors: (*Radar receivers, *Doppler radar), Sensitivity, Frequency, Pulse compression, Radar signals, Bandwidth.

There is a basic constraint imposed on radar measurements when the transmitted signal is a simple, CW pulse. As a result, the radar designer may wish to use a more complex signal and thereby extract more information from an echoing object. Unfortunately, the processed returns of the sophisticated waveforms usually consist of a peak response and small adjacent responses (called 'time sidelobes') which degrade the resolving capability of the radar. One means of reducing the sidelobes is to use a transversal equalizer in the radar receiver. A mathematical model of the equalizer is presented and the sensitivities of an equalized system to uncompensated Doppler frequency shifts are computed. It is shown that the Doppler frequency band over which the equalizer is effective decreases as (1) the signal bandwidth decreases, (2) the distances of the large sidelobes from the main pulse increase, and (3) the magnitudes of the uncompensated sidelobes increase. Testing the equalizer in a highly sensitive, tracking radar indicates that sidelobes 40 db below the main response can be obtained for a fixed Doppler frequency shift. Experimental data illustrating the stability of an equalized system in the presence of a Doppler shift show that, for a typical pulse-compression system, the equalizer utility is generally confined to situations where the frequency shift is within plus or minus 2 percent of the signal bandwidth. (Author)

N66-30534 **Field 17I**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TRACKING SYSTEMS, THEIR MATHEMATICAL MODELS AND THEIR ERRORS. PART II - LEAST SQUARE TREATMENT.
by W. D. Kahn, and F. O. Vonbun. Sep 65, 67p NASA-TM-X-55545, X-507-66-198

Descriptors: *Least squares method, *Position error, *Spacecraft trajectory, *Tracking system, Analysis, Ellipsoid, Equation, Error, Impact, Least, Mathematics, Method, Model, Position, Spacecraft, Square, System, Time, Tracking, Trajectory, Transformation, Vector, Velocity, Weighting.

For abstract, see STAR 04 17.

AD-127 071 **See Field 5E**

AD-46 732 **See Field 5E**

AD-640 914 **See Field 9E**

AD-640 965 **See Field 22C**

AD-640 977 **See Field 8A**

AD-72 813 **See Field 5E**

17J. SEISMIC DETECTION

AD-446 223 **Field 17J, 18C**
CFSTI Price: HC$6.60
UED Earth Sciences Div., Teledyne, Inc., Alexandria, Va.
A COMPARATIVE STUDY OF THE SHOAL EVENT,
by Robert Van Nostrand, and Wayne Helterbran. 29 Aug 64, 64p Seismic Data Lab-109
Contract AF 33(657)-12447
Proj. VT-2037

Descriptors: (*Nuclear explosions, Earthquakes), (*Seismic waves, Analysis), Faults (Geology), Signals, Granite, Seismographs, Wave transmission, Tables, Measurement, Seismological stations, Intensity.

The SHOAL explosion was a part of Project SHADE of the VELA-UNIFORM program to determine characteristic differences between seismic signals recorded from nuclear explosions and earthquakes. The FALLON earthquake occured at moderate depth along the fault zone separating the Sand Springs and Stillwater Ranges from the Fairview and Dixie valleys. The SHOAL explosion was detonated in the granite outcrop area slightly over 40 kilometers southwest of the Fallon epicenter. This choice not only facilitated comparison with the nearby earthquake of comparable magnitude but also with the HARDHAT explosion, also of comparable magnitude, detonated in granite at NTS farther south. Summary descriptions of SHOAL, FALLON, and HARDHAT are given in Table 1. There are a number of characteristic differences previously observed for explosions and earthquakes at different locations recorded at relatively small distances. These same differences are quite apparent for the SHOAL and FALLON events occuring near the same location. In both cases, there is substantially more energy apparent in the compressional waves from SHOAL and in the shear waves from FALLON. Differences in separation of the phases Pn, Pg, and Lg for SHOAL occurring at the surface and FALLON occurring at a depth of a few kilometers are also apparent. (Author)

18A. FUSION DEVICES (THERMONUCLEAR)

ORNL-3989 **Field 18A, 20I**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
THERMONUCLEAR DIVISION SEMIANNUAL PROGRESS REPORT FOR PERIOD ENDING APRIL 30, 1966.
Aug 66, 164p
Contract W-7405-eng-26

Descriptors: (*Thermonuclear reactions, Plasma physics), (*Plasma medium, Stability).

For abstract, see NSA 20 21.

PB-173 187 **Field 18A, 20I**
CFSTI Prices: HC$11.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
RESULTATS EXPERIMENTAUX SUR BILLE EN TETE 'A' (Results Obtained from the 'Bille En Teta A' Experiment),
by Paul Evrard, Jean Jacquinot, Christian Leloup, Jean-Pierre Poffe, and Francois Waelbroeck. Jul 66, 110p CEA-R-3000
Text in French; Attached Summary in English.

Descriptors: (*Plasma medium, Transport properties), Thermonuclear reactions, Containment, Magnetic fields, Magnetic pinch, Stability, Particles, Thermodynamics, Deuterium, France.

Identifiers: Magnetic bottles.

Contents: Collisions en champ magnetique homogene (Collisions in homogeneous magnetic field); Collisions en boutele magnetique a miroir (Collisions in magnetic mirror bottle).

PB-173 183 **See Field 14B**

PB-173 185 **See Field 20I**

18B. ISOTOPES

AD-641 062 **Field 18B, 20H**
Not available from CFSTI.
Florida State Univ., Tallahassee.
LOW-LYING ENERGY LEVELS IN ODD-MASS Sc ISOTOPES,
by H. S. Plendl, L. J. Defelice, and R. K. Sheline. 24 May 65, 16p
Grant AF-AFOSR-440-65
Proj. AF-9751
Task 975102
AFOSR-66-1274
Availability: Published in Nuclear Physics v73 p131-44 1965.

Descriptors: (*Scandium, *Nuclear energy levels), (*Nuclear models, Scandium), Titanium, Proton bombardment, Alpha decay, Isotopes, Nuclear spectroscopy, Alpha spectra, Ground state, Nuclear cross sections.

The reactions 46Ti (p, alpha)43Sc, 48Ti (p, alpha)45Sc and 50Ti (p, alpha)47Sc were initiated in isotopically enriched and natural targets with protons of 9.9.5 and 10 MeV from a tandem accelerator. The reaction products were analysed and detected at 45, 60 and 125 degrees with a magnetic spectrograph. The Q values, excitation energies and absolute cross sections were determined. The energy level spectra of 43Sc, 45Sc and 47Sc emerging from this and other recent work are used to determine the applicability of several nuclear models to these nuclei. (Author)

DP-1066 **Field 18B**
CFSTI Prices: HC$7.00 MF$1.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
LARGE SCALE PRODUCTION AND APPLICATIONS OF RADIOISOTOPES OF THE AMERICAN NUCLEAR SOCIETY NATIONAL TOPICAL MEETING, MARCH 21-23, 1966, AUGUSTA, GEORGIA.
May 66, 290p CONF-660305-Vol2
Contract AT (07-1)-1
Proceedings of the American Nuclear Society National Topical Meeting, March 21-23, 1966, Augusta, Georgia.

Descriptors: (*Radioactive isotopes, Production), (*Power reactors, Radioactive isotopes).

For abstract, see NSA 20 21.

DP-1066 **Field 18B**
CFSTI Prices: HC$7.00 MF$1.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
LARGE SCALE PRODUCTION AND APPLICATIONS OF RADIOISOTOPES.
May 66, 333p CONF-660305-Vol-1
Contract AT (07-1)-1
Proceedings of the American Nuclear Society National Topical Meeting, March 21-23, 1966, Augusta, Georgia.

Descriptors: (*Radioactive isotopes, Production), (*Nuclear industrial applications, Radioactive isotopes).

For abstract, see NSA 20 21.

KLX-1876 **Field 18B, 11D**
CFSTI Prices: HC$2.25 MF$1.25
Vitro Engineering Co., New York.
ENGINEERING AND EVALUATION STUDY FOR THE MANUFACTURE OF WOOD-PLASTIC COMPOSITES,
by J. H. Frankfort, and K. M. Black. 3 Jun 66, 206p
Contract AT (30-1)-3493

Descriptors: (*Composite materials, Plastics), (*Plastics, Wood).

For abstract, see NSA 20 21.

MLM-1311 **Field 18B**
CFSTI Prices: HC$2.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
MOUND LABORATORY PROGRESS REPORT FOR NOVEMBER 1965,
by J. F. Eichelberger, G. R. Grove,and L. V. Jones. 22 Nov 65, 24p
Contract AT (33-1)-GEN-53

Descriptors: (*Isotope separation, Gas flow), (*Thermal diffusion, Radioactive isotopes).

For abstract, see NSA 20 21.

MLM-1312 **Field 18B**
CFSTI Prices: HC$2.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
MOUND LABORATORY PROGRESS REPORT FOR DECEMBER 1965,
by J. F. Eichelberger, G. R. Grove, and L. V. Jones. 20 Dec 65, 30p
Contract AT (33-1)-GEN-53

Descriptors: (*Isotope separation, Programming (Computers)), (*Thermal diffusion, Radioactive isotopes).

For abstract, see NSA 20 21.

PB-173 190 **Field 18B, 18D**
CFSTI Prices: HC$4.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
ANALYSE DE MELANGES DE RADIONUCLEIDES PAR UN DISPOSITIF SIMPLE DE COINCIDENCES ALPHA-GAMMA ET BETA-GAMMA (Analysis of Radionuclide Mixtures by Alpha-Gamma and Beta-Gamma Coincidences Using a Simple Device),
by Raymond Pottier, and Rene Berger. Jun 66, 48p CEA-R-3033
Text in French; Attached Summary in English.

Descriptors: (*Radioactive isotopes, *Nuclear spectroscopy), Alpha decay, Beta decay, Gamma emission, Coincidence counters, Pulse height analyzers, Americium, Neptunium, Ruthenium, Rhodium, Plutonium, Zirconium, Niobium, Mixtures, Analysis, France.

A procedure is described of qualitative and quantitative spectrographic analysis of radioactive sources containing two alpha-gamma emitters having the same alpha energy or two beta-gamma emitters having the same gamma energy. The main apparatus is a multichannel pulse-height analyzer including a coincidence circuit. The principle of the method, the synoptic schema, the electronic device, the type of sources, and the precautions to be taken or the corrections to take into account are reported. The results obtained in solving the three following problems are discussed as examples of applications of the method: (1) analysis of 241Am in alpha-gamma sources containing 238Pu; (2) analysis of 237Np in beta-gamma sources containing 239Pu; (3) analysis of 106Ru-106Rh in beta-gamma sources containing 95Zr-95Nb. (Author)

AD-640 810 **See Field 6R**

BNWL-244 **See Field 18G**

18C. NUCLEAR EXPLOSIONS

AD-446 223 **See Field 17J**

AD-640 626 **See Field 15F**

AD-640 842 **See Field 8K**

AD-641 188 **See Field 6R**

18D. NUCLEAR INSTRUMENTATION

AD-640 976 **Field 18D, 4A**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
TERRESTRIAL MAGNETIC FIELD EFFECTS ON AN ELECTROSTATIC ANALYZER.
Instrumentation papers,
by George A. Kuck. May 66, 44p AFCRL-IP-99, AFCRL-66-377
Proj. AF-8600
Task 860006

Descriptors: (*Terrestrial magnetism, *Radiation measurement systems), Perturbation theory, Van Allen radiation belt, Scientific satellites, Protons, Electrons.

Identifiers: Electrostatic analyzers.

A uniform magnetic field perturbation of the 1/r coulomb field between the plates of a spherical quadrant electrostatic analyzer was calculated using action-angle variables. The effect of the uniform earth's magnetic field on the electrostatic analyzer flown on satellite 1963-25 beta was shown to be negligible for particle energies above 10 keV. For electron energies below 1 keV, the perturbation of the electron trajectories would not be negligible for analyzer plates with a mean radius of 5 cm. (Author)

AD-641 301 **Field 18D, 9A**
Not available from CFSTI.
Pittsburgh Univ., Pa. Dept. of Physics.
CORRECTION OF FREE INDUCTION DECAY DISTORTIONS DUE TO FINITE BANDWIDTHS OF PICKUP COIL AND RECEIVER,
by D. E. Barnaal, and I. J. Lowe. 22 Dec 65, 4p
Grant AF-AFOSR-196-63
Proj. AF-9761
Task 976101
AFOSR-66-1744
Availability: Published in The Review of Scientific Instruments v37 n4 p428-30 Apr 1966.

Descriptors: (*Magnet coils, Distortion), Signals, Nuclear magnetic resonance, Corrections, Circuits, Bandwidth, Inductance.

The effects of the finite bandwidth of the pickup coil, amplifier, and detector on free induction decay shapes are calculated. The results show that it is normally necessary to correct for the finite bandwidth of these elements, and a procedure for doing this is presented. The circuit of a broad band, balanced, rf phase sensitive detector is given. (Author)

K-1632 **Field 18D**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge Gaseous Diffusion Plant, Tenn.
A GRAVIMETRIC GAS FLOW STANDARD, PART II. PERFORMANCE AND EVALUATION,
by W. T. Collins, and T. W. Selby. 15 Apr 66, 78p
CONF-660902-1
Contract W-7405-eng-26

Descriptors: (*Gas flow, Instrumentation), (*Gravimetric analysis, Standards).

For abstract, see NSA 20 21.

N66-31935 **Field 18D**
CFSTI Prices HC$2.50 MF$0.75
Iit Research Inst., Chicago, Ill.
A FAST-NEUTRON SPECTROMETER OF ADVANCED DESIGN FINAL REPORT, 3 MAY 1965 - 3 FEB. 1966.
by R. B. Moler. 11 Apr 66, 76p NASA-CR-76535
Contract NAS8-11885

Descriptors: *Fast neutron, *Helium 3, *Proportional counter, *Solid state device, *Spectrometer, Counter, Detector, Device, Fast, Gamma, Identification, Neutron, Particle, Proportion, Rejection, Silicon, Solid, State.

For abstract, see STAR 04 17.

N66-32527 **Field 18D**
CFSTI Prices HC$1.00 MF$0.50
Central Lab. For Radiological Protection, Warsaw (Poland).
STRONTIUM-90-YTTRIUM-90 MEASUREMENTS USING SILICON COUNTERS.
by A. Dabrowski, M. Jagusztyn, and J. Roman. 1966, 24p CLOR-45/D

Descriptors: *Silicon radiation detector, *Strontium 90, *Yttrium, Background, Barrier, Beta, Counting, Detector, Particle, Radiation, Silicon, Surface.

For abstract, see STAR 04 17.

N66-32632 **Field 18D**
CFSTI Prices HC$2.50 MF$0.75
Oak Ridge National Lab., Tenn. Neutron Physics Div.
EFFICIENCY OF ORGANIC SCINTILLATORS FOR FAST NEUTRONS.
by R. J. Schuttler. Jul 66, 67p NASA-CR-76968, ORNL-3888
Contract NASA ORDER R-104, W-7405-ENG-26

Descriptors: *Fast neutron, *Scintillator, Collision, Detection, Efficiency, Fast, Gamma,

Height, Neutron, Organic, Pulse, Ray, Resolution, Scattering, Threshold.

For abstract, see STAR 04 17.

N66-37271 Field 18D
CFSTI Prices HC$2.50 MF$0.75
Research Triangle Inst., Durham, N. C. Measurement And Controls Lab.
A THEORETICAL STUDY OF THE GAMMA-RAY SCATTERING TECHNIQUE FOR MEASURING ATMOSPHERIC DENSITY FINAL REPORT.
by R. P. Gardner, and D. R. Whitaker. Aug 66, 58p NASA-CR-66142
Contract NAS1-5467

Descriptors: *Atmospheric density, *Atmospheric scattering, *Density measurement, *Gamma radiation, Atmospheric, Density, Gamma, Gauge, Measurement, Modeling, Radiation, Scattering, Theoretical.

For abstract, see STAR 04 22.

N66-37522 Field 18D
CFSTI Prices HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
ABSOLUTE EFFICIENCY MEASUREMENTS OF NE-213 ORGANIC PHOSPHORS FOR DETECTING 14.4 AND 2.6 ME V NEUTRONS.
by N. W. Hill, T. A. Love, R. W. Peelle, and R. T. Santoro. Sep 66, 47p NASA-CR-78398, ORNL-3893
Contract NASA ORDER R-104/1/, W-7405-ENG-26

Descriptors: *Neutron detector, *Phosphor, *Scintillator, Calibration, Deuteron, Efficiency, Height, Helium, Liquid, Monte carlo method, Organic, Pulse, Spectrometer.

For abstract, see STAR 04 22.

ORNL-3924 Field 18D, 20G, 20H
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
PHYSICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING DECEMBER 31, 1965.
May 66, 179p
Contract W-7405-eng-26

Descriptors: (*Nuclear physics, Reports), (*Nuclear engineering, Scientific research).

For abstract, see NSA 20 21.

AD-641 034 See Field 20H

BNWL-250 See Field 6R

N66-31866 See Field 18H

PB-173 190 See Field 18B

18F. RADIATION SHIELDING AND PROTECTION

AD-462 61 Field 18F
CFSTI Price: HC$1.60
Naval Civil Engineering Lab., Port Hueneme, Calif.
THE VARIATION OF DOSE ATTENUATION OF TWO-LEGGED CONCRETE DUCTS WITH INCIDENT GAMMA-RAY ENERGY.
Final rept., Dec 64-Feb 65,
by James M. Chapman. 16 Apr 65, 12p Technical note TN-707
Proj. Y-F008-08-05-201

Descriptors: (*Duct bends, Gamma rays), Radiation damage, Rectangular bodies, Attenuation, Radioactive isotopes, Measurement, Gold, Cesium, Cobalt, Albedo, Concrete, Programming (Computers), Radiological dosage.

Gamma-ray dose attenuation factors were measured in a 3-foot square and an 11-inch square duct using Au-198 (.412 Mev), Cs-137 (.662 Mev), and Co-60 (1.25 Mev) gamma-ray sources. Attenuation factors for given geometries were compared as a function of the incident gamma-ray energy. It was found that the attenuation factor decreases monotonically with increasing energy. Measured attenuation factors were compared with values obtained using a computer code based on the albedo concept. It was found that calculated attenuation factors are high by as much as g8 percent for Au-198 in the 11-inch duct. (Author)

AD-640 865 Field 18F, 20H, 22A
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
ANGULAR DISTRIBUTIONS AND ENERGY SPECTRA OF ELECTRONS TRANSMITTED THROUGH AND REFLECTED FROM ELEMENTAL FOILS,
by Bruce W. Shumway, William E. Kreger, and Ralph M. Brown. 24 Oct 66, 41p USNRDL-TR-1069

Descriptors: (*Electron bombardment, *Foils), (*Shielding, Electron bombardment), Carbon, Aluminum, Copper, Silver, Gold, Electron beams, Scattering, Energy, Nuclear spectroscopy, Attenuation, Van Allen radiation belt, Spacecraft.

Experimental electron energy spectra at various angles of emergence or reflection from foils of carbon, aluminum, copper, silver, and gold were measured. Thicknesses used ranged from 0.2 to 0.6 of the electron range. In all cases the incident radiation was a broad, monodirectional, monenergetic electron beam perpendicular to the foil. Beam energies were 0.5, 0.75, 1.0, 1.5, and 1.95 MeV. The spectrometer used as anthracene crystal as the detector. (Author)

AD-641 134 Field 18F
CFSTI Prices: HC$3.00 MF$0.75
Technical Operations Research, Burlington, Mass.
STRUCTURE SHIELDING FROM SIMULATED FALLOUT GAMMA RADIATION.
Final rept., phase 2,
by A. L. Kaplan, J. Waldman, N. B. Koepp-Baker, W. E. Barch, and R. L. MacNeil. Jun 66, 99p TO-B-65-123
Contract N228 (62479)65776
Proj. 1110
Task 64-200 (1)
USNRDL-TRC-30
See also AD-629 217.

Descriptors: (*Structures, *Shielding), (*Gamma rays, Radioactive fallout), Simulation, Theory, Experimental data, Floors, Walls, Thickness, Steel, Cylindrical bodies.

Two experiments were performed in this second phase of a study designed to evaluate the validity of the current structure shielding theory. The first experiment completed measurements begun earlier of inland down basement radiation. Here, the floor barrier reduction factor presently used to predict basement reduction factors theorectically was found to produce calculations lower, by a factor of between 1.5 and 7, than the experimental results. A new theoretical floor barrier reduction factor, which is a function of both the floor thickness and the solid angle fraction subtended at the detector by the floor, was constructed within the formalism of the existing structure shielding theory. This new function agrees quite well with both experimental results and Monte Carlo calculations, over the entire range of wall and floor thicknesses used in the experiment. The second experiment investigated the assumption that in evaluating the barrier reduction factor an inhomogeneous barrier can be treated theoretically as a homogeneous barrier of appropriate thickness. For the wall thicknesses, rib spacing, and rib size studied, this assumption was found to be quite satisfactory at distances behind the barrier larger than one-half the rib spacing. (Author)

AD-641 161 Field 18F
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
VENT-GAS TREATMENT PLANT.
Final rept.,
by J. Ackerman, R. Bundrick, J. Cowles, V. DuVal, and D. Shoeberger. 21 Oct 66, 19p AEC-VUF-3016
Rept. on Vela Uniform Program Proj. Dribble Salmon Event, Tatum Salt Dome, Miss., 22 Oct 64. Sponsored by ARPA and AEC.

Descriptors: (*Explosion gases, Nuclear explosions), (*Decontamination, Explosion gases), Underground explosions, Processing.

Identifiers: Vela Uniform program, Dribble project.

As part of the Vela Uniform program, Project Dribble was concerned with the measurement of seismic signals generated by nuclear detonation in a salt dome. The report describes a vent-gas treatment facility which was connected to the post-shot drilling rig at the well head to remove radioactive particulates from the cavity effluents and control release rate of gaseous radioactivity to meet public health safety standards.

BNWL-236 Field 18F, 9B
CFSTI Prices: HC$4.00 MF$1.00
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
ISOSHLD: A COMPUTER CODE FOR GENERAL PURPOSE ISOTOPE SHIELDING ANALYSIS.
by R. L. Engel, J. Greenborg, and M. M. Hendrickson. Jun 66, 147p
Contract AT (45-1)-1830

Descriptors: (*Programming (Computers), Radioactive isotopes), (*Radioactive isotopes, Shielding).

For abstract, see NSA 20 21.

N66-30592 Field 18F
CFSTI Prices HC$5.00 MF$1.25
Oak Ridge National Lab., Tenn.
ABSTRACTS OF DIGITAL COMPUTER CODE PACKAGES ASSEMBLED BY THE RADIATION SHIELDING INFORMATION CENTER.
by B. F. Maskewitz. 1966, 183p NASA-CR-76199, ORNL-RSIC-13
Contract NASA ORDER R-104, DASA ORDER EO-804-66

Descriptors: *Abstract, *Code, *Digital computer, *Radiation shielding, Calculation, Computer, Content, Data, Digital, Language, Method, Package, Problem, Processing, Program, Radiation, Restriction, Routine, Run, Shielding, Solution, Time.

For abstract, see STAR 04 17.

N66-31936 Field 18F
CFSTI Prices HC$3.00 MF$0.75
General Dynamics/fort Worth, Tex. Nuclear Aerospace Research Facility.
A STUDY OF SOME REACTOR SHIELDING PROBLEMS FOR SPACECRAFT APPLICATIONS.
by E. E. Jones, and M. B. Wells. 29 Oct 62, 114p NASA-CR-76529, FZK-154
Contract NAS8-1573

Descriptors: *Computer program, *Radiation measurement, *Reactor, *Shielding, *Snap-8, *Spacecraft radiation, Beam, Calculation, Computer, Flux, Gamma, Measurement, Monte carlo method, Neutron, Program, Ra-

diation, Radiator, Scattering, Single, Spacecraft.

For abstract, see STAR 04 17.

N66-37140 **Field 18F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL NEUTRON FLUX ALBEDO FOR CONCRETE.
by J. A. Kish, I. T. Myers, and J. J. Smithrick. Sep 66, 18p NASA-TM-X-1287
Contract 120-27-01-03-22

Descriptors: *Albedo, *Concrete, *Fast neutron, *Neutron flux, *Thermal neutron, Beam, Chamber, Flux, Measurement, Neutron, Nuclear, Reactor, Source, Space, Thermal.

For abstract, see STAR 04 22.

N66-37216 **Field 18F**
CFSTI Prices HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT, PERIOD ENDING 31 MAY 1966.
Sep 66, 46p NASA-CR-78263, ORNL-3973, VOL. II
Contract NASA ORDER R-104, W-7405-ENG-26

Descriptors: *Neutron physics, *Nuclear shielding, *Radiation detector, Accelerator, Alpha, Collision, Cross section, Detector, Emission, Energy, Flux, Gamma, High energy, Monte carlo method, Muon, Neutron, Nuclear, Nucleon, Particle, Physics, Pion, Protection, Proton, Radiation, Reaction, Shielding, Spacecraft, Spectroscopy, Spectrum, Transport.

For abstract, see STAR 04 22.

N66-37554 **Field 18F**
CFSTI Prices HC$1.00 MF$0.50
United Kingdom Atomic Energy Authority, Risley (England).
THE STEAM-GENERATING HEAVY-WATER REACTOR.
by H. Cartwright. 1966, 16p TRG-1246/R/

Descriptors: *Heavy water components test reactor (hwctr), *Sodium graphite reactor (sgr), *Steam generator, Cost, Heavy water, Hwctr, Nuclear, Pressure, Reactor, Safety, Sgr, Tube.

For abstract, see STAR 04 22.

N66-37586 **Field 18F**
CFSTI Prices HC$1.00 MF$0.50
United Kingdom Atomic Energy Authority, Risley (England). The Reactor Group.
SOME MEASUREMENTS OF THE ACOUSTIC SPECTRUM PRODUCED BY SUB-COOLED NUCLEAR BOILING.
by I. D. Macleod. 1966, 22p TRG-1205/R/

Descriptors: *Noise spectrum, *Nucleate boiling, *Sound measurement, Acoustic, Bubble, Frequency, Gas, Measurement, Noise, Size, Subcooling, Vessel, Water, White.

For abstract, see STAR 04 22.

PB-173 242 **Field 18F, 6R, 18G**
CFSTI Prices: HC$7.60 MF$0.75
Commissariat a l'Energie Atomique, Chusclan (France). Centre de Production de Plutonium de Marcoule.
LA RADIOPROTECTION DES INSTALLATIONS DE DEGAINAGE DES COMBUSTIBLES IRRADIES ET DES RADIOELEMENTS A MARCOULE (The Health Physics of Installations for Uncanning Irradiated Fuels or for Handling Radio-Elements at Marcoule),
by Jean Chassany, Pierre Guillermin, and Pierre Mallet. 1966, 80p CEA-R-3019
Text in French; attached summary in English.

Descriptors: (*Radioactive isotopes, Handling), (*Health physics, *Nuclear physics laboratories), Radiation hazards, Filters (Fluid), Radioactive waste, Air conditioning systems, Dosimeters, Shielding, France.

Elements of considerable specific radio-activity are handled under water in these installations. A study was made of water-filtration and of the ventilation in particular. The installations were divided up into zones depending on the radio-active risks, and the irradiation and atmospheric contamination is the object of a systematic control at various points. A description is given of all aspects of health physics which have been encountered during six years: storage, transfer of radio-active material, uncanning, rolling, waste evacuation, specialised operations, installations in operation and at rest, and transport. In spite of the gradual increase in the activity of these installations, the total doses received by the personnel have hardly altered and the number of cases of physical contamination has diminished. (Author)

18G. RADIOACTIVE WASTES

AD-640 622 **Field 18G, 21F**
CFSTI Prices: HC$3.00 MF$0.75
Naval Radiological Defense Lab., San Francisco, Calif.
RADIONUCLIDE RELEASE FROM AEROSPACE NUCLEAR REACTOR FUELS. V. PHASE TWO: PULSED NEUTRON IRRADIATION OF FUEL IN WATER,
by L. W. Weisbecker, M. G. Lai, H. A. Goya, and H. I. Cordova. 24 May 66, 70p USNRDL-TR-1046
Contract AT (49-5)-2084
See also AD-419 453.

Descriptors: (*Reactor fuels, Fission products), (*Fission products, Sea water), Reactor hazards, Nuclear propulsion, Aerospace craft, Reactor safety systems.

Accidental seawater immersion of a NERVA/ROVER type core would result in a criticality excursion, releasing fission product radionuclides to the environment. In order to simulate the excursion situation and to study the resulting radionuclide release, specimens of NERVA/ROVER fuel were irradiated under different pulsed neutron conditions in a TRIGA Mark F reactor, the KEWB reactor, and the KIWI-TNT reactor excursion test. Most of these specimens were irradiated immersed in water. Under these conditions measurements were made of (1) the fission product inventories of fuel specimen and environmental water (2) internal capsule pressure generated, (3) fuel body and microstructure damage, and (4) leaching properties of irradiated fuel. Irradiation effects of greater than moderate significance occurred only in the fuel specimen irradiated most severely in the KIWI-TNT reactor excursion test. Release of fission products to the water appeared to be a function of exposed surface area of the fuel and was less dependent on specimen specific fissioning for both long term leaching after irradiation and during irradiation. Fission product fractionation in the fuel was a function of the specimen specific fissioning. All fission products which fractionated, except I131, have a volatile precursor. (Author)

BNWL-244 **Field 18G, 18B, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
FORMATION OF SELECTED FISSION PRODUCTS IN POWER REACTORS,
by C. A. Rohrmann, and E. T. Merrill. May 66, 48p
Contract AT (45-1)-1830

Descriptors: (*Power reactors, Fission products), (*Power supplies, Radioactive isotopes).

For abstract, see NSA 20 21.

BNWL-265 **Field 18G**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
SULFUR DETERMINATION SUPPORTING THE WASTE SOLIDIFICATION PROGRAM,
by L. F. Lust, and B. P. Van Der Cook. Jul 66, 9p
Contract AT (45-1)-1830

Descriptors: (*Radioactive waste, Processing), (*Sulfur, Radioactive waste).

For abstract, see NSA 20 21.

IN-1011 **Field 18G**
CFSTI Prices: HC$2.00 MF$0.50
Idaho Nuclear Corp., Idaho Falls.
LEACHABILITY OF ALUMINA CALCINE PRODUCED IN THE IDAHO WASTE CALCINING FACILITY,
by B. E. Paige. Jul 66, 26p
Contract AT (10-1)-1230

Descriptors: (*Fission products, Recovery), (*Radioactive waste, Processing).

For abstract, see NSA 20 21.

NAA-SR-11766 **Field 18G, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
FISSION-PRODUCT RETENTION IN SODIUM A SUMMARY OF ANALYTICAL AND EXPERIMENTAL STUDIES AT ATOMICS INTERNATIONAL,
by W. P. Kunkel. 8 Aug 66, 94p
Contract AT (11-1)-GEN-8

Descriptors: (*Sodium, Fission products), (*Fission products, Reactor hazards).

For abstract, see NSA 20 21.

N66-32372 **Field 18G**
CFSTI Prices HC$1.00 MF$0.50
India. Dept. Of Atomic Energy, Bombay.
INCINERATION OF LOW-LEVEL RADIOACTIVE SOLID WASTES AND GAS CLEANING - SOME OPERATIONAL EXPERIENCES.
by R. V. Amalraj, A. A. Khan, and K. T. Thomas. 1966, 25p AEET-243
Presented At Symp. On Treatment Of Low And Intermediate Level Radioactive Wastes, Vienna, 6-10 Dec. 1965, Sponsored By Intern. Atomic Energy Agency

Descriptors: *Incinerator, *Radioactive waste, *Waste disposal, Alpha, Cleaning, Combustion, Contamination, Design, Disposal, Filtration, Flue, Furnace, Gas, Instrumentation, Operation, Particle, Plant, Radioactivity, Solid, Waste.

For abstract, see STAR 04 17.

ORNL-3958 **Field 18G, 7A**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
UNIT OPERATIONS SECTION QUARTERLY PROGRESS REPORT, OCTOBER-DECEMBER 1965,
by M. E. Whatley, P. A. Haas, R. W. Horton, and C. D. Watson. Jul 66, 60p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel processing, Power reactors), (*Organic solvents, Solvent extraction).

For abstract, see NSA 20 21.

PB-173 242 **See Field 18F**

18H. RADIOACTIVITY

AD-342 723 **Field 18H**
CFSTI Price: HC$30.20
IIT Research Inst., Chicago, Ill. Technology Center.
DEBRIS HAZARDS, A FUNDAMENTAL STUDY,
by Edward B. Ahlers. 1 Jun 66, 306p
Contract DA-49-146-XZ-097
Proj. IITRI-8231
DASA-1362

Descriptors: (*Radioactive fallout, Nuclear explosions), (*Fragmentation, Charges (Explosive)), (*Nuclear explosions, Hazards), Underwater explosions, Soils, Dust, Mathematical models, Vulnerability, Distribution, Cratering, Detection, Underground explosions, Structures, Fracture (Mechanics), Blast, Ignition, Fuels, Wind, Detonation waves, Shock waves, Theory, Military personnel, Statistical analysis, Statistical data, Probability, Equations, Trajectories, Velocity.

This report describes the collection and analysis of data on various aspects of debris formation and dispersion, and examples of data utilization in estimating debris environment in several situations. The approach in the study was to collect extensive data from past experimental and analytical investigations bearing on debris formation and dispersion. By further study the most meaningful formats were summarized to be used as inputs to approximate solutions for debris environment predictions.

AD-640 615 **Field 18H, 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
NEUTRON IRRADIATION EMBRITTLEMENT OF SEVERAL HIGHER STRENGTH STEELS,
by Lendell E. Steele, J. Russell Hawthorne, and Robert A. Gray Jr. 7 Sep 66, 22p NRL-6419
Contract AT (49-5)-2110
Projs. RR007-01-46-5409, SF020-01-05-0858

Descriptors: (*Steel, *Radiation damage), Maraging steels, Transition temperature, Pressure vessels, Embrittlement, Neutrons, Pressurized water reactors, Ductility, Mechanical properties.

Several steels representative of recently developed types and having potential for nuclear structural applications were exposed to high energy nuclear radiation, and the resultant properties were compared with those of the currently used A212-B and A302-B nuclear reactor pressure vessel steels. Preliminary results from several comparative irradiation experiments indicate that certain higher strength steels, in addition to having initial qualities of higher strength and lower initial ductile-brittle transition temperatures, show smaller embrittlement, earlier embrittlement saturation, and a superior overall response to irradiation at 550F than that observed for the steels in current reactor pressure vessels. (Author)

AD-640 888 **Field 18H, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Armed Forces Radiobiology Research Inst., Bethesda, Md.
ON THE ANGLE AND ENERGY DISTRIBUTION OF PHOTONS PRODUCED BY A REAL AND TWO SIMULATED FALLOUT FIELDS,
by C. W. Garrett. Jul 66, 38p AFRRI-SP66-1
Proj. DB-03.1402

Descriptors: (*Radioactive fallout, Simulation), (*Photons, Radioactive fallout), Energy, Distribution.

A qualitative discussion is given outlining the need to study radiation fields of military interest, noting the parameters involved in defining such fields, and describing some methods by which these parameters may be evaluated. A discussion of characteristics of the radiation fields for each of the following five geometries associated with fallout is presented: (1) in air 3 feet above a fallout field; (2) at the midpoint of a foxhole in a fallout field; (3) in air 3 feet above the ground and 200 feet from a cobalt-60 source; (4) at the midpoint of a foxhole 200 feet from a cobalt-60 source; and (5) at the central point of a conceptual, compact, sophisticated fallout simulator. The latter three cases represent methods which might be employed to simulate the actual fallout radiation fields as described by the first two cases. The simulated fields are qualitatively compared with their actual counterparts. (Author)

AD-641 043 **Field 18H, 20H**
Not available from CFSTI.
Carnegie Inst. of Tech., Pittsburgh, Pa.
THE CONVERSION COEFFICIENT OF SOME GAMMA RAYS IN In113, In115, Xe129, AND Xe133,
by S. Jha, M. Friedman, B. Patniak, and J. L. Power. 1966, 7p
Grant AF-AFOSR-278-65
Proj. AF-9751
Task 975102
AFOSR-66-1773
Availability: Published in Internal Conversion Processes p327-31 1966.

Descriptors: (*Indium, Internal conversion), (*Xenon, Internal conversion), (*Internal conversion, *Gamma-ray spectra), Radioactive decay, Nuclear spectroscopy, Electrons.

The conversion coefficient of a few gamma-ray transitions are reported. The method of the conversion coefficient determination was to measure simultaneously the electron spectrum and the unconverted gamma-ray spectrum from a standard source and then, in an identical geometry, measure the electron and the unconverted gamma-ray spectrum of the source in question. (Author)

DP-1031 **Field 18H, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
INTERACTION OF FISSILE UNITS, A COMPUTER CODE INTERACT,
by Hugh K. Clark. Jun 66, 59p
Contract AT (07-2)-1

Descriptors: (*Reactor safety systems, Programming (Computers)), (*Reactor lattice parameters, Reactor safety systems).

For abstract, see NSA 20 21.

66-31866 **Field 18H, 18D**
CFSTI Prices HC$2.00 MF$0.50
Central Lab. For Radiological Protection, Warsaw (Poland).
ABSOLUTE METHOD OF THE GAMMA-RAY BACKGROUND DETERMINATION BY MEANS OF NA I/ TL/ SCINTILLATION COUNTER.
Metoda Bezwzglednego Pomiaru Tla Promieniowania Gamma Licznikiem Scyntylacyjnym Naj/ tl/
by J. Pensko. 1966, 26p CLOR-46/D
Submitted For Publication

Descriptors: *Background radiation, *Gamma radiation, *Scintillation counter, Absolute, Background, Beta, Calibration, Cosmic, Counter, Dose, Gamma, Iodide, Method, Radiation, Rate, Response, Scintillation, Sodium, Spectrometer, Thallium.

For abstract, see STAR 04 17.

N66-32564 **Field 18H**
CFSTI Prices HC$1.00 MF$0.50
Kyoto Univ. (Japan). Kwasan Observatory.
THE EFFECT OF ULTRAVIOLET RADIATION ON THE IONIZATION AND EXCITATION OF MATTER IN PROMINENCES. II - CONTINUOUS SPECTRA.
by I. Kawaguchi. 1965, 16p
Its Contrib. No. 144

Descriptors: *Excitation, *Prominence, *Ultraviolet radiation, Alpha, Atom, Continuous, Density, Depth, Electron, Emission, Energy, Hydrogen, Intensity, Ionization, Level, Line, Lyman alpha radiation, Matter, Optical, Radiation, Spectrum, Temperature, Ultraviolet.

For abstract, see STAR 04 17.

ORNL-NSIC-17 **Field 18H, 18I, 18J**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
ABNORMAL REACTOR OPERATING EXPERIENCES.
Aug 66, 106p
Contract W-7405-eng-26

Descriptors: (*Reactor operation, Nuclear reactors), (*Reactor safety systems, Reactor operation).

For abstract, see NSA 20 21.

UCRL-14413 **Field 18H**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
THE FRAN PROMPT BURST REACTOR,
by D. B. Stillman, and S. W. Mead. 29 Sep 65, 37p
Contract W-7405-eng-48

Descriptors: (*Critical assemblies, Thermal expansion), (*Reactor lattice parameters, Reactor fuel enrichment).

For abstract, see NSA 20 21.

UCRL-14700 **Field 18H, 6R, 4B**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
WASHOUT OF PARTICULATE MATTER IN LONG-TERM CLOUDS PRODUCED BY NUCLEAR EXPLOSIONS,
by Allen H. Petersen. 14 Mar 66, 24p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Clouds), (*Clouds, Radioactivity).

For abstract, see NSA 20 21.

AD-640 585 **See Field 20L**

AD-640 782 **See Field 20E**

AD-640 804 **See Field 20L**

AD-640 821 **See Field 9E**

AD-641 153 **See Field 20L**

AD-641 164 **See Field 9A**

PB-173 189 **See Field 3B**

18I. REACTOR ENGINEERING AND OPERATION

ANL-7228 **Field 18I, 18J, 18L, 18M**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
CATALOG OF NUCLEAR REACTOR CONCEPTS. PART I. HOMOGENEOUS AND QUASI-HOMOGENEOUS REACTORS, SECTION VI. SOLID HOMOGENEOUS (SEMIHOMOGENEOUS) REACTORS,
by Charles E. Teeter, James A. Lecky, and John H. Martes. Jun 66, 71p
Contract W-31-109-eng-38

Descriptors: (*Homogeneous reactors, Reactor fuel elements), (*Reactor fuel elements, Reactor moderators).

For abstract, see NSA 20 21.

BNWL-263 **Field 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
STRUCTURAL ANALYSIS OF A HEXAGONAL TUBE OR RING UNDER INTERNAL PRESSURE,
by C. D. Flowers. Jun 66, 51p
Contract AT (45-1)-1830

Descriptors: (*Reactor system components, Structural properties), (*Loading (Mechanics), Stresses).

For abstract, see NSA 20 21.

DP-1049 **Field 18I, 18J, 18M**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
THE HEAVY WATER COMPONENTS TEST REACTOR SAFETY SYSTEMS, FUEL FAILURE DETECTION, AND STANDBY CONDITION.
May 66, 38p
Contract AT (07-2)-1

Descriptors: (*Heavy water reactors, Reactor safety systems), (*Reactor safety systems, Test reactors).

For abstract, see NSA 20 21.

DP-1053 **Field 18I**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
NONDESTRUCTIVE TEST OF CARBON BEDS FOR REACTOR CONFINEMENT APPLICATIONS.
Progress rept., Oct 64-Jan 66,
by David R. Muhlbaier. Jun 66, 30p
Contract AT (07-2)-1

Descriptors: (*Reactor operation, Non-destructive testing), (*Radiation measurement systems, Confinement).

For abstract, see NSA 20 21.

IDO-17191 **Field 18I, 18J, 18M**
CFSTI Prices: HC$3.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
NUCLEAR TECHNOLOGY BRANCHES QUARTERLY REPORT, OCTOBER 1-DECEMBER 31, 1965.
Jun 66, 56p
Contract AT (10-1)-205

Descriptors: (*Reactor system components, Nuclear engineering), (*Reactor theory, Inelastic scattering).

For abstract, see NSA 20 21.

NAA-SR-11952 **Field 18I, 18L, 18N**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
SNAP-10A EXPANSION COMPENSATOR.
Final rept.,
by L. R. Stone, and W. D. Whitaker. 15 Jul 66, 81p
Contract AT (11-1)-GEN-8

Descriptors: (*Nuclear power plants, Energy conversion), (*Reactor coolants, Thermal expansion).

For abstract, see NSA 20 21.

N66-31955 **Field 18I**
CFSTI Prices HC$1.00 MF$0.50
India. Dept. Of Atomic Energy, Bombay.
THEORETICAL REACTOR PHYSICS STUDIES ANNUAL PROGRESS REPORT, 1965.
by B. P. Rastogi. 1966, 25p AEET-248

Descriptors: *Abstract, *Bibliography, *Reactor technology, Code, Computer, Control, Cycle, Design, Fuel, Heavy, Operation, Optimization, Physics, Program, Reactor, Technology, Theory, Transport, Water.

For abstract, see STAR 04 17.

N66-37315 **Field 18I**
CFSTI Prices HC$1.00 MF$0.50
Catholic Univ. Of America, Washington, D. C.
A FUNDAMENTAL AND FEASIBILITY STUDY OF RING- VORTEX GASEOUS-CORE CAVITY REACTOR FIFTH SEMIANNUAL REPORT, 1 FEB. - 31 JUL. 1966.
by C. C. Chang. 1 Aug 66, 19p NASA-CR-78048
Grant NSG-586

Descriptors: *Fluid mechanics, *Gas reactor, *Vortex ring, Abstract, Cavity, Core, Cylinder, Flow, Gaseous, Geometry, Heat transfer, Mass, Pattern, Radiation, Reactor, Technology, Toroid, Transfer.

For abstract, see STAR 04 22.

N66-37537 **Field 18I**
CFSTI Prices HC$3.00 MF$0.75
Technische Hogeschool, Eindhoven (Netherlands).
ON THE HYDRAULIC CHARACTERISTICS OF A BOILING WATER CHANNEL WITH NATURAL CIRCULATION.
by C. L. Spigt. 20 Jan 29, 69p

Descriptors: *Boiling water reactor, *Channel flow, *Cooling system, *Hydrodynamics, Annulus, Characteristics, Circulation, Fluid, Measurement, Mechanics, Nuclear, Pressure, Stability, Velocity.

For abstract, see STAR 04 22.

N66-37587 **Field 18I, 13L**
CFSTI Prices HC$1.00 MF$0.50
Authority Health And Safety Branch, United Kingdom Atomic Energy Authority, London (England). Safeguards Div.
THE SAFETY OF PRESSURE VESSELS AGAINST FAST FRACTURE.
by E. Bevitt, W. H. Irvine, and A. Quirk. 1966, 17p AHSB/S/-R-107

Descriptors: *Crack formation, *Fracture, *Pressure vessel, Brittleness, Cyclic, Effect, Equation, Growth, Hot, Instability, Irradiation, Prestress, Reactor, Safety.

For abstract, see STAR 04 22.

PB-173 192 **Field 18I, 9B**
CFSTI Prices: HC$9.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CODE CACTUS,
by Maurice Fajeau, Nguyen Luong Than, and Jean-Pierre Saunier. Sep 66, 100p CEA-R-3039
Text in French; Attached Summary in English.

Descriptors: (*Reactor operation, *Programming (Computers)), (*Reactor coolants, Hydrodynamics), Heat exchangers, Thermal properties, Light water reactors, Reactor kinetics, Reactor safety systems, Reactor fuels, France.

Identifiers: Cactus program.

The code handles the following problems: (1) analysis of thermal experiments on a water loop at high or low pressure; steady state or transient behavior; (2) analysis of thermal and hydrodynamic behavior of water-cooled and moderated reactors, at either high or low pressure, with boiling permitted; fuel elements are assumed to be flat plates; (3) flowrate in parallel channels coupled or not by conduction across plates, with conditions of pressure drops or flowrate, variable or not with respect to time. The power can be coupled to reactor kinetics calculation or supplied by the code user. The code contains a schematic representation of safety rod behavior. CACTUS, a one dimensional, multi-channel code has for complement FLID, a one channel, two-dimensional code. (Author)

WCAP-6074 **Field 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
ENGINEERING AND METALLURGICAL EVALUATION OF AN IRRADIATED YANKEE CORE I CONTROL ROD,
by W. R. Smalley, and E. Paxson. Jul 66, 58p
Contract AT (30-1)-3017

Descriptors: (*Control rods, Reactor cores), (*Reactor system components, Reactor coolants).

For abstract, see NSA 20 21.

NAA-SR-11766 **See Field 18G**

ORNL-NSIC-17 **See Field 18H**

18J. REACTOR MATERIALS

AD-641 283 **Field 18J, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
NEUTRON SPECTRAL CONSIDERATIONS AFFECTING PROJECTED ESTIMATES OF RADIATION EMBRITTLEMENT OF THE ARMY SM-1A REACTOR PRESSURE VESSEL.
Final rept.,
by C. Z. Serpan, Jr., and L. E. Steele. 30 Sep 66, 31p NRL-6474
Proj. USA-ERG-4-66

Descriptors: (*Embrittlement, Steel), (*Pressure vessels, *Pressurized water reactors), (*Radiation damage, *Steel), Reactor materials, Neutron reactions, Power reactors, Army, Alaska.

Identifiers: Army reactors (SM-1A).

The pressure vessel of the Army SM-1A reactor is located close to the active core in such a manner that the neutron exposure is relatively high; consequently, the pressure vessel steel undergoes a relatively rapid rise in the ductile-brittle transition temperature. The maximum permissible delta NDT for the SM-1A is established by the Army as 340F. Since it is physically impossible to irradiate surveillance test speciments at the SM-1A vessel wall, only the neutron flux was measured at the wall, and representative test specimens were irradiated in a test reactor, the Low Intensity Test Reactor (LITR). In translating the delta NDT versus neutron exposure data from the LITR to the case of the SM-1A reactor vessel wall, the neutron spectra of the two reactors were used to adjust both the SM-1A reactor vessel flux and the LITR exposure values in terms of n/sq cm > 1.0, 0.5, and 0.183 Mev. Since the distribution of neutrons by energy groups was different within each reactor at the specific location of interest, that is, the vessel wall of the SM-1A and an in-core location of the LITR, the damaging potential of the SM-1A reactor spectrum location was related to that of the LITR. With damage equivalence established between the two reactors, a critical neutron exposure (n/sq cm > 0.5 Mev) may be projected for producing the maximum delta NDT on the SM-1A reactor vessel wall. By relating this critical exposure to SM-1A reactor operations, a critical power output level of 67 Mw-yr was established. The same Mw-yr critical power output levels will

be obtained if the neutron exposure is reported as n/sq cm > 1 Mev or n/sq cm > 0.183 Mev. If the reactor spectra were assumed to be fission spectra, however, the Mw-yr critical power output limit for neutrons > 1 Mev, for instance, would be 49.5. (Author)

LA-3488 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
LEACHING OF URANIUM BY HYDROGEN CHLORIDE FROM PYROLYTIC-CARBON-COATED URANIUM DICARBIDE BEADS,
by Maynard E. Smith, John H. Cappis, and Glenn R. Waterbury. 1 Feb 66, 32p
Contract W-7405-eng-36

Descriptors: (*Reactor fuel processing, Corrosion inhibition).

For abstract, see NSA 20 21.

N66-31073 **Field 18J**
CFSTI Prices HC$2.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Astronuclear Lab.
PREPARATION OF MICROSCOPIC CROSS SECTIONS OF U235 FOR REACTOR CALCULATIONS.
by D. W. Drawbaugh, G. Gibson, and M. M. Melnick. 28 Feb 66, 41p NASA-CR-76434, WANL-TME-1384
Contract SNP-1
Presented At Am. Phys. Soc. Conf. Neutron Cross Section Technol., Washington, 22-24 Mar. 1966

Descriptors: *Neutron cross section, *Reactor physics, *Uranium 235, Background, Calculation, Epithermal, Fission, Independence, Microscopy, Nerva, Neutron, Physics, Reactor, Resonance, Table, Temperature.

For abstract, see STAR 04 17.

N66-31624 **Field 18J**
CFSTI Prices HC$4.00 MF$1.00
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
EXPERIMENTAL PROGRAM TO INVESTIGATE STABILITY, COMPATIBILITY AND CORROSION OF POISON SOLUTIONS AND STRUCTURAL MATERIALS. TASK 3 B - FEASIBILITY OF A CHEMICAL POISON LOOP SYSTEM SUMMARY REPORT.
by D. N. Fultonberg, and G. R. Taylor. Jul 66, 128p NASA-CR-54995, WCAP-2867
Contract NAS3-5215

Descriptors: *Loop, *Poison, *Reactor control *Structural material, Autoclave, Cadmium, Chemical, Compatibility, Control, Corrosion, Feasibility, High pressure, High temperature, Low temperature, Material, Nuclear, Reactor, Rocket, Solution, Stability, Stainless, Steel, Structural, Sulfate, Test, Zircaloy.

For abstract, see STAR 04 17.

N66-32629 **Field 18J**
CFSTI Prices HC$2.50 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
TEST AND ANALYSIS OF DESIGN OF A MANIFOLD AND REENTRANT TUBE ASSEMBLY. TASK 3 A - FEASIBILITY OF A CHEMICAL POISON LOOP SYSTEM SUMMARY REPORT.
by A. A. Bishop, and F. C. Engel. Jul 66, 89p NASA-CR-54994, WCAP-2870
Contract NAS3-5215

Descriptors: *Reactor control, *Water moderated reactor, Chemical, Control, Distribution, Flow, Loop, Moderation, Poison, Reactivity, Reactor, Rocket, Tube, Tungsten, Water.

For abstract, see STAR 04 17.

ORNL-3983 **Field 18J, 18M**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
DEVELOPMENT OF A FORMING METHOD FOR CURVED ATR FUEL PLATES,
by J. H. Erwin, Sigfred Peterson, and C. F. Leitten Jr. Aug 66, 38p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel elements, Test reactors), (*Reactor fuel plates, Manufacturing methods).

For abstract, see NSA 20 21.

PB-173 186 **Field 18J, 7E, 11B**
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
PREPARATION ET ETUDE DES NITRURES ET CARBONITRURES D'URANIUM ET DE PLUTONIUM (Preparation and Study of the Nitrides and Mixed Carbidenitrides of Uranium and of Plutonium),
by Francois Anselin. Jun 66, 90p CEA-R-2988
Text in French; Attached Summary in English.

Descriptors: (*Reactor fuels, Preparation), (*Uranium compounds, Synthesis (Chemistry)), (*Plutonium compounds, Synthesis (Chemistry)), Ceramic materials, Nitrides, Carbides, Solid solutions, Phase studies, Sintering, Additives, Nickel, Oxides, X-ray diffraction analysis, Diffusion, Solubility, Frane.

Identifiers: Plutonium carbides, Plutonium nitrides, Uranium carbides, Uranium nitrides.

A detailed description is given of a simple method for preparing uranium and plutonium nitrides by the direct action of nitrogen under pressure at moderate temperatures on the partially hydrogenated bulk metal. It is shown that there is complete miscibility between the UN and PuN phases. A study was made of the sintering of these nitrides as a function of the preparation conditions with or without sintering additives. The best results were obtained for pure UN at 1600C on condition that a well defined powder was used. The criterion used is the integral width of the X-ray diffraction lines. The compounds UN and PuN are completely miscible with the corresponding carbides. This makes it possible to prepare carbide-nitrides of the general formula (U,Pu) (C,N) by solid-phase diffusion at around 1400C. The sintering of these carbide-nitrides is similar to that of the carbides if the nitrogen content is low; in particular, nickel is an efficient sintering agent. For high contents, the sintering is similar to that of pure nitrides. (Author)

SC-CR-66-2044 **Field 18J**
CFSTI Prices: HC$6.00 MF$1.25
TRW Systems, Redondo Beach, Calif.
STUDY OF THE CHEMICAL INTEGRITY OF RADIOISOTOPE CONTAINMENT MATERIALS IN LAUNCH ABORT ENVIRONMENTS,
by J. L. Blumenthal, J. D. Kuenzly, and M. J. Santy. Apr 66, 240p
Contract AT (19-1)-789

Descriptors: (*Radioactive isotopes, Containment), (*Reactor materials, Reactor operation).

For abstract, see NSA 20 21.

AD-640 615 **See Field 18H**

ANL-7228 **See Field 18I**

BNWL-263 **See Field 18I**

DP-1049 **See Field 18I**

IDO-17191 **See Field 18I**

NAA-SR-11913 **See Field 12A**

NLCO-980 **See Field 7D**

ORNL-NSIC-17 **See Field 18H**

ORNL-3963 **See Field 7D**

WCAP-6074 **See Field 18I**

18K. REACTOR PHYSICS

N66-31349 **Field 18K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
PROGRAM FOR CALCULATION OF NEUTRON AGES FROM EXPERIMENTAL ACTIVATION DATA.
by T. T. Semler. Jul 66, 33p NASA-TM-X-1260

Descriptors: Activation, Age, Analysis, Calculation, Code, Computer, Computer program, Curve, Data, Decision, Error, Fitting, Neutron, Numerical, Numerical analysis, Program, Quadrature, Statistical, Theory.

For abstract, see STAR 04 17.

N66-31940 **Field 18K**
CFSTI Prices HC$5.00 MF$1.00
General Motors Corp., Indianapolis, Ind.
GASEOUS-FUELED CAVITY REACTORS - CRITICALITY CALCULATIONS AND ANALYSIS.
Jul 66, 164p NASA-CR-487, EDR-3997
Conract NAS3-6073

Descriptors: *Computer program, *Nuclear propulsion, *Reactor technology, Cavity, Code, Computer, Critical, Cross section, Dimensional, Fuel, Gaseous, Ibm 7094 computer, Material, Neutron, Nuclear, Program, Propulsion, Reactor, Rocket, Size, Technology, Temperature, Transport.

For abstract, see STAR 04 17.

N66-37538 **Field 18K**
CFSTI Prices HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
DIFFERENTIAL CROSS SECTIONS FOR THE PRODUCTION OF PROTONS IN THE REACTIONS OF 160- ME V PROTONS ON COMPLEX NUCLEI.
by N. W. Hill, T. A. Love, R. W. Peelle, and R. T. Santoro. Sep 66, 105p NASA-CR-78298, ORNL-3887
Contract NASA ORDER R-104/1/, W-7405-ENG-26

Descriptors: *Nucleus, *Proton beam, *Proton scattering, Aluminum, Beryllium, Bismuth, Carbon, Cobalt, Cross section, Difference, Incidence, Physics, Production, Secondary, Spectrometry, Target, Water.

For abstract, see STAR 04 22.

PB-173 194 **Field 18K, 18M**
CFSTI Prices: HC$4.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
FLUX DE NEUTRONS RAPIDES DANS LES PILES A EAU LOURDE (Fast Neutron Flux in Heavy Water Reactors),
by Jacques Brisbois, and Shlomo L. Katz. Jul 66, 44p CEA-R-3048
Text in French; Attached Summary in English.

Descriptors: (*Heavy water reactors, *Neutron flux), (*Fast neutrons, Neutron flux), Research reactors, Reactor kinetics, Reactor lattice parameters, Programming (Computers), Monte Carlo method, Reactor cores, Reactor reflectors, France.

Identifiers: Saclay reactors (Aquilon).

The possibility of calculating the fast neutron flux in a natural uranium - heavy water lattice by superposition of the individual contributions of the different fuel elements was verified using a monodimensional Monte-Carlo code. The results obtained are in good agreement with experimental measurements done in the core and reflector of the reactor AQUILON. (Author)

18L. REACTORS (POWER)

AD-640 919 **Field 18L, 13D**
Not available from CFSTI.
Pennsylvania State Univ., University Park. Dept. of Engineering Mechanics.
CASCADE ARRANGEMENT IN SPHERICAL VESSEL DESIGN FOR NUCLEAR POWER REACTORS,
by L. W. Hu, and J. C. Schutzler. 22 Dec 65, 11p
Grant AF-AFOSR-127-66
Proj. AF-9782
Task 978202
AFOSR-66-1674
Prepared in cooperation with Douglas Aircraft Co., Inc., Santa Monica, Calif., Missile and Space Systems Div.
Availability: Published in Nuclear Engineering and Design v3 p412-20 1966.

Descriptors: (*Pressure vessels, Cascade structures), (*Power reactors, Pressure vessels), Pressurized water reactors, Design.

The use of pressure vessels in cascade arrangement instead of the conventional single shell vessels is proposed for nuclear power reactor design, particularly in view of meeting the demand of increasing pressures and temperatures for pressurized-water reactors. The stress analysis and a procedure for the minimum weight design of irradiated cascade spherical shells are presented. A numerical example of two stage spherical shells is given to demonstrate the procedures developed as well as the need for such type of pressure vessels in nuclear reactor design. (Author)

N66-37406 **Field 18L**
CFSTI Prices HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
REVIEW OF INDUSTRY-PROPOSED IN-PILE THERMIONIC SPACE REACTORS. VOLUME I - GENERAL.
by J. P. Davis, H. Gronroos, and W. Phillips. 15 Oct 65, 19p NASA-CR-78331, JPL-TM-33-262, VOL. I
Contract NAS7-100

Descriptors: *Nuclear fuel, *Thermionic reactor, *Uranium carbide, Alloy, Carbide, Cermet, Diode, Dioxide, Fuel, Industry, Level, Nuclear, Physics, Power, Reactor, Thermionic, Uranium.

For abstract, see STAR 04 22.

AD-641 283 **See Field 18J**

ANL-7228 **See Field 18I**

BNWL-244 **See Field 18G**

NAA-SR-11879 **See Field 10A**

NAA-SR-11952 **See Field 18I**

PB-173 246 **See Field 5C**

18M. REACTORS (NON-POWER)

ANL-7228 **See Field 18I**

DP-1049 **See Field 18I**

IDO-17191 **See Field 18I**

ORNL-3983 **See Field 18J**

PB-173 194 **See Field 18K**

18N. SNAP TECHNOLOGY

N66-30971 **Field 18N**
CFSTI Prices HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
SNAP-8 CORROSION PROGRAM QUARTERLY PROGRESS REPORT, PERIOD ENDING MAY 31, 1965.
by E. L. Compere, W. R. Huntley, R. E. Mac pherson, H. W. Savage, and A. Taboada. Sep 65, 22p NASA-CR-76382, ORNL-3859
Contract NASA ORDER C-220-A, W-7405-ENG-26

Descriptors: *Closed loop system, *Corrosion, *Snap- 8, Closed, Cold, Coolant, Flow, Forced, Loop, Mass, Material, Rate, System, Transfer, Trapping.

For abstract, see STAR 04 17.

NAA-SR-11879 **See Field 10A**

NAA-SR-11913 **See Field 12A**

NAA-SR-11952 **See Field 18I**

19A. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-449 348 **Field 19A**
CFSTI Price: HC$2.60
Army Missile Command, Redstone Arsenal, Ala.
EXPLODING BRIDGEWIRE ELECTRICAL SYSTEM TEST UNIT,
by James Darryl Holder. 11 Sep 64, 23p Rept. no. RG-TR-64-13
Proj. 1-B-2-7919-D-678

Descriptors: (*Exploding wires, Firing tests (Ordnance)), Voltage, Discriminators, Guided missiles (Surface-to-surface).

The object of the test was to develop a method to field test the Exploding Bridgewire (EBW) System for proper functioning prior to use. Two basic designs were conceived and tested. The first design using a two element spark gap and a calibrated fuse link did not prove successful. The second method using a passive network and a three element spark gap was shown to be capable of yielding an adequate test for EBW Systems. (Author)

AD-640 702 **Field 19A, 7B**
Not available from CFSTI.
Picatinny Arsenal, Dover, N. J.
STUDY OF THE ACTION OF LEAD AZIDE ON COPPER.
Rept. no. 1 (Final).
21 Feb 42, 8p PA-TR-1152
Not reproducible by Clearinghouse standards.

Descriptors: (*Explosive materials, Sensitivity), (*Azides, Synthesis (Chemistry)), (*Lead compounds, Azides), (*Copper compounds, Azides), Detonators, Materials, Moisture, Carbon dioxide, Copper alloys.

Identifiers: Copper azide, Lead azide.

It was found that cupric azide is considerably more sensitive than lead azide and that, in the presence of moisture, the copper azide is formed when copper is in contact with either pure, crystalline lead azide or with the desensitized form. When moisture is absent, no reaction takes place; but, contrary to the widely held belief, the presence of carbon dioxide alone does not cause the reaction to take place. As an extremely sensitive product can be formed by the reaction of copper and lead azide under conditions which are difficult to prevent, it is recommended that the use of copper alloys be prohibited in ammunition where such metal shall be in contact with lead azide. (Author)

AD-640 812 **Field 19A**
CFSTI Prices: HC$2.00 MF$0.50
Frankford Arsenal, Philadelphia, Pa. Ammunition Development and Engineering Labs.
PRE-MISSION PREPARATION OF FLARE, AIRCRAFT, PARACHUTE, MK 24, ALL MODS WITH SAFETY LANYARD RETROFIT.
Technical note,
by A. J. Grandy. Sep 66, 28p
Proj. DA-11G60242
FA-TN-1116

Descriptors: (*Parachute flares, Preparation), (*Aircraft flares, Preparation), Safety, Arming devices, Launching.

A field method is described for retrofitting existing MK 24 flares with a 50-foot safety lanyard in order to increase fuze arming distance when these flares are manually launched from the interior of fixed or rotary wing aircraft. (Author)

N66-30760 **Field 19A**
CFSTI Prices HC$1.00 MF$0.50
Innsbruck Univ. (Austria). Inst. For Theoretical Physics.
LIE SERIES SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS FINAL REPORT, 1 JUL. 1965 - 31 JUL. 1966.
by F. Cap. 1966, 11p NASA-CR-76314
Contract NGR-52-046-001

Descriptors: *Linear equation, *Partial differential equation, *Problem solving, Application, Differential, Equation, Helmholtz equation, Lie, Linear, Mathieu function, Order, Partial, Problem, Progress, Report, Second, Series, Solution.

For abstract, see STAR 04 17.

AD-640 824 **See Field 9A**

19D. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-640 609 **Field 19D**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
ON DETONATION IN A GAS HEATED BY A SHOCK WAVE,
by R. I. Soloukhin. 3 Aug 66, 20p TG-230-T494
Contract NOw-62-0604
TT-66-62472
Trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n4 p40-8 1964.

Descriptors: (*Detonations, Gases), Shock waves, USSR, Flames, Combustion, Reaction kinetics.

The initiation and characteristics of detonations in gas mixtures heated to high temperatures by a shock wave are observed experimentally at low pressures. Numerical calculations of the reaction kinetics of hydrogen-oxygen mixtures highly diluted with argon were confirmed. Vibrationless stable detonation may occur. The calculated characteristics of such detonation agree with the experimental values. It is still impossible to determine the effect of preheating on reaction initiation mechanisms in high temperature mixtures. (Author)

AD-640 666 **Field 19D, 9B, 1B**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ammunition Depot, Crane, Ind.
TWO-DIMENSIONAL FLIGHT COMPUTER PROGRAM,
by Ralph Chipman. 21 Sep 66, 38p RDTR-83

Descriptors: (*Programming (Computers), *Flight paths), Flight simulators, Equations of motion, Drag, Ballistics, Bombs, Range tables, Numerical analysis.

Identifiers: IBM 1620.

This report describes a two-dimensional flight computer program written for the IBM 1620 computer. The program is used to calculate the trajectory and instantaneous velocity of an object that is projected upward from the ground at any angle or projected or released from an aircraft. Mathematical derivation, options for using, and computer operator instructions are presented. Also, included are certain checks that were made to compare the accuracy of the program with bombing tables, range tables, and theoretical equations. (Author)

AD-641 011 **Field 19D, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
NUMERICAL COMPUTATION OF THE DISTANCE FROM A POINT TO AN ELLIPSOID,
by A. Celmins, and W. Sacco. Aug 66, 22p Rept. no. BRL-1328
Proj. RDT/E-1P014501A14B

Descriptors: (*Numerical analysis, *Dynamic programming), (*Ranges (Distance), Numerical analysis), Ellipsoids, Geometry, Ballistics.

A problem of current interest in weapon evaluation studies at the Ballistic Research Laboratories requires an efficient method for computing the distance from an arbitrary point in space to a given ellipsoid. Two techniques for performing the calculation are proposed in the report. (Author)

AD-641 027 **Field 19D, 22B**
CFSTI Prices: HC$7.00 MF$1.75
Texas Western Coll., El Paso.
UNGUIDED ROCKET BALLISTICS CONFERENCE 30 AUGUST-1 SEPTEMBER 1966.
Preprints.
1 Sep 66, 350p
Sponsored by Army Electronics Command.
Availability: Published in Preprints of Papers to be Presented at the Conference.

Descriptors: (*Symposia, *Rocket trajectories), Sounding rockets, Ballistics, Rockets, Data processing systems, Impact prediction, Wind, Guided missile targets.

Contents: Simulation program for aeroballistic research and trajectory analysis, A simplified ballistics model for sounding rockets, The dynamic equations of a flexible rocket vehicle, Pitch-plane natural frequencies of a flexible sounding rocket, The Aerobee 150 as a ballistic model, Operational requirements of the athena ballistic model, Wind variability over a complex surface, An automatic data collection and processing network, Methods used by the ballistic research laboratories in determining performance parameters for fin stabilized free-flight missiles, Recent changes in the analogue data handling capabilities at data analysis center, Comparative analysis of various methods of impact point prediction for unguided rockets, Circular probable error estimates derivable from one formula, Techniques leading to the formulations of the data report of the meteorological rocket network firings, A general impact prediction scheme for use on a small or medium size computer, A digital computer subroutine for the automatic selection of radar data for instantaneous impact prediction, Development of a ballistic missile target, Some applications of wind to unguided rocket impact predictions, Basic requirements for firing unguided rockets relative to missile flight, Basic considerations in the development of an unguided rocket trajectory simulation model, Meteorological instrumentation for rocket ballistic support, Layer wind measurement by acoustic means, Ballistic wind variability, Requirements for field impact predictions, Iterative techniques for computing launcher settings.

AD-448 632 **See Field 4B**

AD-640 863 **See Field 14C**

19E. FIRE CONTROL AND BOMBING SYSTEMS

AD-640 621 **Field 19E, 9B, 12A**
CFSTI Prices: HC$10.60 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
A STUDY OF INVERSE INTERPOLATION OF THE ENIAC,
by Haskell B. Curry, and Willa A. Wyatt. 19 Aug 46, 101p Rept. no. 615
See also PB-33 105.

Descriptors: (*Range tables, *Approximation (Mathematics)), (*Functions, Approximation (Mathematics)), Iterative methods, Programming (Computers), Integrators (Computers).

Identifiers: ENIAC.

A study is made of methods of using the Eniac to convert a table giving values of two functions x (t, phi), for evenly spaced values of t (time) and phi (angle of departure) into a table giving t for evenly spaced values of x and phi. At the same time there may be additional functions of t and phi to be expressed in terms of x and phi. A basic scheme for doing this is set up and programmed in detail. This scheme contains three additional functions y, z, w. The basic scheme is such as to be readily modified; some modifications are studied and programmed in somewhat less detail than the basic scheme. (Author)

19F. GUNS

AD-448 060 **Field 19F**
CFSTI Price: HC$1.60
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
SOME LIMITATIONS ON THE PERFORMANCE OF HIGH-VELOCITY GUNS,
by John S. Curtis. Aug 64, 14p Contract Technical note, CTN64-03
Contract DA-04-495-ORD-3567 (Z), ARPA Order-357-63
Proj. 7400
Hypervelocity Range Research Program, a part of Project Defender.

Descriptors: (*Hypervelocity guns, Light gas guns), Scientific research, Test equipment, Performance (Engineering), Projectiles, Velocity, Acceleration, Metals, Compressive properties.

It is the purpose of this note to discuss the velocity regime over which the light-gas gun will be useful as a research tool. This will be done by considering the ration of accelerating forces to the strength of the projectile. The velocity achieved in any launcher is the product of the acceleration and the time of launch if the acceleration is constant, and it is the integral under the acceleration-time curve for variable-acceleration launches. (Author)

AD-640 660 **Field 19F, 11D**
CFSTI Prices: HC$1.00 MF$0.50
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
EVALUATION OF IRRADIATED WOOD-PLASTIC COMBINATIONS FOR USE AS GUN STOCKS.
Technical rept.,
by E. A. Jennings, and S. L. Eisler. Sep 66, 16p
Proj. DA-1L013001A91A
R1A-66-2791

Descriptors: (*Gun components, Composite materials), Wood, Acrylic resins, Impregnation, Gamma rays, Polymerization, Mechanical properties, Costs, Weight.

Wood-plastic combinations were prepared from four wood species: white pine, yellow pine, maple, and walnut, by impregnation with methyl methacrylate and subsequent exposure to gamma radiation. Results of static bending, hardness, and toughness tests showed no appreciable improvement in the properties beyond those of the untreated walnut. Furthermore, increased weight and cost indicate that wood-plastic materials prepared from readily available soft woods would not serve as suitable substitutes for walnut gun stocks. (Author)

AD-640 580 **See Field 11G**

20. PHYSICS

N66-31903 **Field 20**
CFSTI Prices HC$3.75 MF$1.50
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 81.
by G. G. Harvey, and H. J. Zimmermann. 15 Apr 66, 287p NASA-CR-76504
Contract NSR-22-009-120, Grant NSG-496

Descriptors: *Communication theory, *Physics, *Plasma dynamics, Acoustics, Beam, Biophysics, Communication, Dynamics, Electron, Engineering, Field, Fusion, Information, Magnetic, Microwave, Nuclear, Physical, Plasma, Processing, Spectroscopy, Theory.

For abstract, see STAR 04 17.

N66-37215 **Field 20**
CFSTI Prices HC$7.00 MF$1.25
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
GENERAL PHYSICS, PLASMA DYNAMICS, AND COMMUNICATION SCIENCES AND ENGINEERING QUARTERLY PROGRESS REPORT NO. 82.
by G. G. Harvey, and H. J. Zimmermann. 15 Jul 66, 312p NASA-CR-78264
Grants NSG-496, NSG-334

Descriptors: *Communication, *Electronics, *Physics, *Plasma dynamics, Acoustics, Astronomy, Beam, Biophysics, Cardiovascular, Collision, Computation, Conversion, Dynamics, Energy, Engineering, Fusion, Information, Language, Laser, Microwave, Molecular, Neurophysiology, Noise, Nuclear, Plasma, Processing, Psychoacoustics, Radio, Spectroscopy, System.

For abstract, see STAR 04 22.

20A. ACOUSTICS

AD-456 095 **Field 20A**
CFSTI Price: C$2.60
Navy Marine Engineering Lab., Annapolis, Md.
ACOUSTIC FILTERS: A STATE-OF-THE-ART SUMMARY ASSIGNMENT 66-105, PHASE V.
Research and development rept.,
by E. Kakaley. Dec 64, 23p MEL-153/64

Descriptors: (*Acoustic filters, Design), Acoustic properties, Noise, Theory, Energy, Absorption, Resonators, Energy conversion, Anechoic chambers, Attenuation, Phase (Electronics), Phase studies.

As an effort to summarize work done by various investigators in the field of acoustic filter design and theory, most of whose work was Government sponsored, this report is a description of the various types of acoustic filters and a brief explanation of the theory upon which their designs were based. Theoretical and experimental studies of the various filter designs are described and discussed. A proposed program of further study of acoustic filter design principles is presented. (Author)

AD-640 769 **Field 20A**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
OBSERVATIONS OF NONELASTIC AUDIOFREQUENCY RESONANCES,
by Edwin R. Fitzgerald. 1966, 9p
Research supported in part by ONR.
Availability: Published in The Journal of Acoustical Society of America v39 n5 pt1 p870-7 May 1966.

Descriptors: (*Audiofrequency, *Resonance), Elasticity, Solids, Deformation, Frequency.

Additional experimental evidence and analysis are presented that tend to confirm the fundamental nature of previously reported nonelastic audiofrequency modes or resonances in solids. The evidence cited includes some results recently advanced by others to demonstrate that the resonances arise from contact and/or apparatus effects, but these results really confirm the resonances as material properties. The particle-wave view of deformation is also strongly supported by these same, supposedly adverse, experimental results. (Author)

AD-640 820 **Field 20A**
CFSTI Prices: HC$3.00 MF$0.75
Goettingen Univ. (West Germany). Physikalisches Institut.
INTERACTION BETWEEN AIR FLOW AND AIRBORNE SOUND IN A DUCT.
Final rept., Feb 63-Jan 64,
by F. P. Mechel, P. A. Mertens, and W. M. Schilz. Sep 65, 60p
Contract AF 61 (052)-666
Proj. AF-7231
Task 723104
AMRL-TR-65-53

Descriptors: (*Acoustics, *Gas flow), Sound, Ducts, Airborne, West Germany, Laminar boundary layer, Stability, Measurement.

Several studies of the interaction between air flow and airborne sound in a duct were made. Three projects were investigated: (1) The excitation of boundary layer distortions in a laminar boundary layer by simulated oscillatory flexural waves was investigated. Results show boundary layer waves are excited whenever the phase velocity of the flexure wave is in the instability range of the phase velocity of boundary layer waves. (2) The propagation of a pressure pulse wave front and the acoustic impedance of porous absorbers are examined in ducts with air flow. Measurements prove the sound energy of the wave front is directed towards the walls and the absorber impedance becomes nonlinear when the absorber is penetrated by the flow. (3) The effect on the acoustic radiation impedance of an orifice with flow discharge restricted by fences and diaphragms was investigated. The acoustic resistance was shown to increase at low frequencies due to the restrictions. (Author)

AD-641 013 **Field 20A, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Engineering.
ATTENUATION AND DISPERSION OF SOUND IN AN AEROSOL.
Final rept. 2 Mar 64-31 Aug 66,
by Richard A. Dobbins. Oct 66, 11p Nonr-562 (37)/3
Contract Nonr-562 (37)
See also 632 911.

Descriptors: (*Aerosols, Acoustic properties), (*Sound, Aerosols), Attenuation, Scattering, Sound transmission, Particle size.

The report describes the research performed on the subject of the attenuation and dispersion of sound in an aerosol. A list of technical reports and publications is included. (Author)

AD-641 269 **Field 20A**
Not available from CFSTI.
Vermont Univ., Burlington. Dept. of Physics.
SOLID EROSION IN LOW-AMPLITUDE SOUND FIELDS,
by S. D. Howkins. 1966, 9p
Grant AF-AFOSR-62-63
Proj. AF-9767
Task 976702
AFOSR-66-1571
Availability: Published in Journal of Acoustical Society of America v39 n1 p55-61 Jan 1966.

Descriptors: (*Erosion, Bubbles), (*Sound, Cavitation), Brass, Water.

The behavior of a bubble of air trapped underwater in a hole, 1 mm in diameter and 1 mm deep, and exposed to a 20-kc/sec sound field was investigated as the applied sound amplitude was slowly increased. It was found that, in degassed water, the bubble could sometimes cause erosion to occur on a nearby polished brass surface at much lower sound amplitudes than when the bubble is absent. Further experiments showed that this was probably due to collapse or transient cavitation occurring in locally enhanced sound-pressure fields in the vicinity of resonant bubbles. This would tend to show that the threshold for collapse cavitation can be affected by bubbles or air pockets present in the liquid. (Author)

N66-29986 **Field 20A**
CFSTI Prices HC$3.00 MF$0.50
Army Missile Command, Huntsville, Ala.
ON THE FREQUENCY OF RETURNING ACOUSTIC RAYS AND FOCUSING FOR HUNTSVILLE AND MISSISSIPPI TEST FACILITY.
by O. M. Essenwanger. 21 Jan 66, 55p NASA-CR-76125, RR-TR-66-2
NASA ORDER H-61485

Descriptors: *Atmospheric refraction, *Focusing, *Reflected ray, *Sound transmission, Acoustics, Atmosphere, Computation, Firing, Meteorology, Ray, Reflection, Refraction, Return, Rocket, Sound, Transmission, Wave.

For abstract, see STAR 04 17.

N66-30759 **Field 20A**
CFSTI Prices HC$2.00 MF$0.50
Syracuse Univ. Research Inst., N. Y. Dept. Of Mechanical And Aerospace Engineering.
NOISE INVESTIGATIONS WITH IMPINGING JET FLOWS STATUS REPORT NO. 6, 1 DEC. 1965 - 31 MAY 1966.
by D. S. Dosanjh, and F. J. Montegani. Jun 66, 36p NASA-CR-76316, ME-1085-660606
Grant NSG-431

Descriptors: *Anechoic chamber, *Axisymmetric flow, *Far field, *Jet flow, *Noise measurement, Acoustic, Anechoic, Axisymmetry, Chamber, Convergence, Far, Field, Flow, Geometry, Impingement, Jet, Measurement, Noise, Power, Radiation, Shadowgraph, Shock.

For abstract, see STAR 04 17.

N66-30793 **Field 20A**
CFSTI Prices HC$1.00 MF$0.50
Wyle Labs., Inc., Huntsville, Ala.
NOISE FIELD FOR SHADOWGRAPH MODEL ROCKET EXPERIMENTS.
by R. C. Potter. Jun 66, 17p NASA-CR-76267, TM-66-18
Contract NAS8-11312

Descriptors: *Jet flow, *Noise measurement, *Rocket exhaust, *Shadowgraph, *Sound field, Calculation, Exhaust, Field, Flow, Hot, Jet, Level, Measurement, Microphone, Model, Noise, Position, Pressure, Rocket, Sound, Spectrum.

For abstract, see STAR 04 17.

N66-31938 **Field 20A**
CFSTI Prices HC$2.50 MF$0.75
Pratt And Whitney Aircraft, West Palm Beach, Fla.
SINGLE STAGE EXPERIMENTAL EVALUATION OF SLOTTED ROTOR AND STATOR BLADING. PART I - ANALYSIS AND DESIGN.
by B. A. Jones, and C. G. Linder. 27 Jul 66, 93p NASA-CR-54544, PWA-FR-1713
Contract NAS3-7603

Descriptors: *Air breathing engine, *Compressor, *High lift device, *Rotor blade, *Stator blade, Air, Blade, Breathing, Device, Diagram, Engine, Flow, Generation, High lift, Propulsion, Rotor, Slot, Stator, Subsonic, System, Vector.

For abstract, see STAR 04 17.

N66-37197 **Field 20A**
CFSTI Prices HC$2.00 MF$0.50
Army Missile Command, Huntsville, Ala.
PROFILE TYPES OF SOUND SPEED IN THE LOWER ATMOSPHERE AND THEIR RELATIONSHIPS TO ACOUSTIC FOCUSING.
by O. Essenwanger. 15 Apr 66, 36p NASA-CR-78295, RR-TR-66-6
NASA ORDER H-61485

Descriptors: *Acoustics, *Lower atmosphere, *Sound velocity, Acoustic, Atmosphere, Azimuth, Climate, Fluctuation, Focusing, Lower, Noise, Profile, Propagation, Season, Sound, Speed, Variation, Velocity.

For abstract, see STAR 04 22.

N66-37515 **Field 20A**
CFSTI Prices HC$2.50 MF$0.75
Bolt, Beranek, And Newman, Inc., Cambridge, Mass.
ROCKET NOISE.
by G. Maidanik, and J. E. Williams. 21 Oct 65, 62p NASA-CR-66165
Contract NAS1-4497
Its Rept.-1324

Descriptors: *Aerodynamic noise, *Lighthill method, *Turbulent flow, Analysis, Convection, Emission, Equation, Far, Field, Flow, Generation, Inhomogeneity, Motion, Near, Parameter, Radiation, Sound, Source, Theory, Turbulence, Wave.

For abstract, see STAR 04 22.

AD-641 166 **See Field 20C**

AD-641 268 **See Field 7D**

20B. CRYSTALLOGRAPHY

AD-453 092 **Field 20B**
CFSTI Price: HC$3.00
Sylvania Electric Products, Inc., Woburn, Mass. Semiconductor Div.
DEVELOPMENT OF EPITAXIAL TECHNOLOGY FOR MICROELECTRONICS AND LARGE AREA DEVICE APPLICATION.
Quarterly rept. no. 10, 1 Aug-31 Oct 64,
by P. Wang, and R. Yee. 31 Oct 64, 66p
Contract NObsr-85431

Descriptors: (*Epitaxial growth, Microminiaturization (Electronics)), Silicon, Manufacturing methods, Processing, Transistors, Diodes (Semiconductor), Semiconducting films, Sandwich construction, Temperature, Integrated circuits, Sapphires, Vapor plating, Silicon compounds, Oxides, Bromides.

The purpose of this project is the continued investigation and improvement of silicon epitaxial technology in order to make its advantages available for use in microelectronic circuits. A study of first epitaxial layer thickness with variation of parameters controlling the second epitaxial layer in multilayer devices has thus far resulted in a fair agreement between experimental and theoretical results. Experimental determination of silicon source compounds and temperatures for an optimum low temperature epitaxial growth system has centered on SiBr4 as a promising system. Polycrystalline silicon deposits over SiO2 over silicon have been grown as thick as 8 mils, with excellent dimensional control. Growth of this type has also been accomplished in moat structures. Problems of warping of these Poly Si/SiO2/Si wafers are being attacked. These epitaxial techniques are all being developed for the fabrication of both optically-activated PNPN matrix structures and silicon monolithic integrated circuits containing both NPN and PNP bipolar transistors. Very encouraging results have been obtained in the growth of sizable single crystal silicon films over sapphire, and PN junction structures fabricated therein show very good diode characteristics. (Author)

AD-640 643 **Field 20B, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
THE PREPARATION AND CHARACTERIZATION OF DIRECT CURRENT AND ASYMMETRIC PERIODIC REVERSE CURRENT ELECTRODEPOSITS OF EPITAXIAL COPPER.
Physical sciences research papers,
by John J. O'Connor, Bernard Rubin, and Reynold Spector. Aug 66, 21p AFCRL-PSRP-258, AFCRL-66-538
Proj. AF-5620
Task 562005

Descriptors: (*Epitaxial growth, Electrodeposition), (*Copper, Epitaxial growth), Single crystals, Substrates.

Single crystal epitaxial deposits of copper have been electrodeposited on (100) oriented single-crystal copper substrates using both direct current and asymmetric periodic reverse current methods. It was found that the degree of crystalline perfection is approximately the same for both methods and reflects the substrate perfection. The epitaxial growth and perfection of the deposits are not appreciably affected by dissolved lead impurities in the electrolyte over the range 0.25 to 100 parts per million of lead. The reverse current deposits have a considerably larger crystallite size which is attributed to a lower effective rate of nucleation. (Author)

AD-640 664 **Field 20B, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana.
DISLOCATION MOTION VIEWED AS AN ELECTRON TUNNELING PROCESS.
Progress rept.,
by J. J. Gilman. Oct 66, 25p
Contract Nonr-3985 (06)

Descriptors: (*Crystal lattice defects, Semiconductors), Tunneling (Electronics), Motion.

The motion of a kink on a dislocation line is reduced to the dissociation of an electron from an adjacent atomic site and its transfer to the kink which thereupon moves. An explicit expression for the kink velocity is derived by means of tunneling. This relates it to the average energy gap, the atomic volume, and the applied stress in good accord with observations. (Author)

AD-640 669 **Field 20B, 20F**
Not available from CFSTI.
Pennsylvania Univ., Philadelphia. Dept. of Physics.
ELECTRIC FIELD-INDUCED INFRARED ABSORPTION IN DIAMOND.
Technical rept.,
by E. Anastassakis, S. Iwasa, and E. Burstein. Oct 66, 14p TR-6
Contract Nonr-551 (51)
Availability: Published in Physical Review 9p.

Descriptors: (*Crystals, Absorption), Infrared radiation, Electric fields, Light transmission, Crystal structure, Scattering, Diamonds.

In the presence of an external electric field, the Raman active q nearly equal to 0 TO and LO vibration modes in diamond type crystals also become infrared active. The strength of absorption is proportional to the first order change in the electronic polarizability per unit cell with the relative displacement of atoms which determines the corresponding intensity of the first order Raman scattering. At a field of 1.2 x 105 volts/cm applied along the x axis with the radiation directed along the - y axis, a transmission minimum (Delta T/T = 2.5%) is observed at 1336/cm at room temperature. From this data we obtain e*/e = 7 x 10 to the minus 7th power E (0) for the electric field induced effective ionic charge (with E (0) in cgs units), and the relative displacement of atoms = 4 x 10 sq cm to the minus 16th power per unit cell. (Author)

AD-640 692 **Field 20B**
Not available from CFSTI.
Virginia Univ., Charlottesville. Dept. of Physics.
PLASTIC DEFORMATION OF SPINNING IRON WHISKERS,
by W. L. Piotrowski, D. C. Larson, and J. W. Beams. 4 Mar 66, 4p
AROD-4036:1
Availability: Published in Journal of Applied Physics v37 n8 p3153-6 Jul 66.

Descriptors: (*Whiskers (Crystals), Deformation), (*Iron, Whiskers (Crystals)), Single crystals, Stresses.

Single-crystal iron whiskers are plastically deformed centrifugally with no gripping constraints. A calculation of the stresses in a rotating body with a square cross section is given which allows a determination of the resolved shear stresses in the whiskers at their yield points. The stresses obtained are intermediate between the bulk values and the smaller whisker values as expected. The average critical resolved shear stress was 6.8 kg/sq mm for all the whiskers except three which yielded at a somewhat lower stress of 4.1 kg/sq mm. For whisker widths ranging from 310 to 820 microns, no systematic dependence of yield stress on size was found.

AD-640 709 **Field 20B, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Columbia Univ., New York. Dept. of Electrical Engineering.
ALTERATION OF CRYSTAL WAVE FUNCTIONS BY LATTICE DEFECTS.
Technical rept.,
by David Redfield. Sep 66, 13p CU-3-66, TR-97
Contract Nonr-4259 (16)
Proj. NR-017-465

Descriptors: (*Crystals, *Wave functions), Crystal lattice defects, Solids, Semiconductors, Carriers (Semiconductors), Doping, Band theory of solids.

Most types of lattice defects are shown to be capable of altering the wave functions of the intrinsic electronic states of solids. This alteration is caused by the strong electric fields arising at charged defects of all types. The effect is similar to that by which a uniform field changes Bloch functions to Houston functions. A number of consequences follow from the changes caused by the modified wave functions in the matrix elements for electronic transitions. Changes in the fundamental optical absorption edge and in the exciton spectrum are shown to be among these consequences. The application of these results to scattering of current carriers in heavily doped semiconductors is suggested. (Author)

AD-640 737 **Field 20B, 11G**
Not available from CFSTI.
Army Electronics Command, Fort Monmouth, N. J. Inst. for Exploratory Research.
GROWTH OF HEXAGONAL FERRITE CRYSTALS BY A MODIFIED PULLING TECHNIQUE,
by T. R. AuCoin, R. O. Savage, and A. Tauber. 17 Dec 65, 2p
Availability: Published in Journal of Applied Physics v37 n7 p2908-9 Jun 1966.

Descriptors: (*Ferromagnetic materials, *Crystal growth), Single crystals, Barium compounds, Zinc compounds, Yttrium compounds, Iron compounds, Oxides, Boron compounds.

AD-640 739 **Field 20B, 11G**
Not available from CFSTI.
Army Electronics Command, Fort Monmouth, N. J.
ELECTRON PROBE MICROANALYSIS OF ZINC-BEARING HEXAGONAL FERRITES,
by J. R. Shappirio. 1966, 10p
Availability: Published in Advances in X-Ray Analysis v9 p304-13 1966.

Descriptors: (*Ferromagnetic materials, Microanalysis), Barium compounds, Iron compounds, Oxides, Zinc compounds, Single crystals, Probes, Experimental data.

The electron probe is shown to be an effective tool for the analysis of the series of ferrimagnetic oxides referred to as the hexagonal ferrites. This series of compounds, containing barium, Fe (3+), and a divalent metal cation, is formed by an ordered stacking of basic structural units in varying ratios. The ideal, complex stoichiometry of these polytype-like mixed-layer structures can be computed from X-ray unit cell data; the various structures and their predicted stoichiometry are reviewed. Results of electron probe analysis of zinc-bearing single-crystal hexagonal ferrites are compared with theoretical values, the various correction procedures applied to the probe data are presented, and the limitations of the method in the analysis of hexagonal ferrites are discussed. The information obtained from this study has laid the groundwork for the determination of chemistry in substituted members of the hexagonal ferrite group, and will contribute significantly to the interpretation of the magnetic properties exhibited by these compounds. (Author)

AD-640 771 **Field 20B, 20C**
Not available from CFSTI.
Oklahoma State Univ., Stillwater. Dept. of Physics.
OPTICAL QUENCHING OF PHOTOCONDUCTIVITY IN SINGLE-CRYSTAL STANNIC OXIDE,
by Jack E. Houston, and E. E. Kohnke. 28 Feb 66, 3p
Availability: Published in Journal of Applied Physics v37 n8p3083-5 Jul 1966.

Descriptors: (*Single crystals, Quenching (Inhibition)), (*Tin compounds, Oxides), Photoconductivity, Heat of activation.

The optical quenching of photoconductivity in single-crystal specimens of stannic oxide has been investigated as a function of extrinsic wavelength and of temperature in the region where sensitization occurs. Quenching is found in a single band extending from the fundamental optical gap at 4.0 eV down to a cutoff indicative of a 1.3-eV activation energy for the sensitizing centers. The discrepancy between this value and the 0.33-eV value obtained earlier from thermal-quenching measurements suggests that the sensitizing states themselves do not play an active role in the process of thermal quenching, but rather that the thermal quenching arises through the action of the shallow electron trapping states. (Author)

AD-640 783 **Field 20B**
Not available from CFSTI.
Northwestern Univ., Evanston, Ill. Dept. of Materials Science.
PRECIPITATION IN NaC1-KC1 MIXED CRYSTALS,
by R. G. Wolfson, W. Kobes, and M. E. Fine.
1966, 11p
Contract AF 49 (638)-524
Proj. AF-9763
Task 976301
AFOSR-66-1299
Availability: Published in Journal of Applied Physics v37 n2 p704-12 Feb 1966.

Descriptors: (*Crystals, Dispersion hardening), (*Alkali metal compounds, Chlorides), Sodium compounds, Potassium compounds, Mixtures, Mechanical properties, Fracture (Mechanics), Stresses, Hardness, Aging (Materials).

The mechanical properties of precipitation-hardened dilute mixtures of KC1 in NaC1 were studied. Two peaks in the flow stress occur. The suggested sequence of events is growth of coherent CK1-rich platelets, loss of coherence, growth of incoherent KC1-rich platelets, and finally recrystallization. The fracture stress is maximum for a long aging time considerably beyond the second hardness peak where the presence of rather coarse precipitates interferes with the cleavage process and increases the energy to propagate a fracture. This is an important principle for increasing the fracture strength of ceramics. (Author)

AD-640 944 **Field 20B**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill. Inst. for the Study of Metals.
THE PSEUDOHARMONIC THEORY OF LATTICE VIBRATIONS,
by Morrel H. Cohen, and Richard M. Martin.
1965, 3p
Contract Nonr-2121 (22)

Descriptors: (*Crystal lattices, *Vibration), Potential theory, Energy, Statistical mechanics, Thermodynamics, Phase studies.

A self-consistent harmonic hamiltonian is derived to describe lattice vibrations in an anharmonic crystal. The force constants are shown to be both self-consistent averages of derivatives of the instantaneous potential energy and derivatives of the free energy with respect to the mean atomic positions at all temperatures. Questions of thermodynamic stability and structural phase transitions are thus embraced by the present theory. (Author)

AD-640 949 **Field 20B, 7D**
Not available from CFSTI.
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
CRYSTALLOGRAPHIC DATA FOR SOME NEW TYPE II CLATHRATE HYDRATES,
by D. F. Sargent, and L. D. Calvert. 23 Feb 66, 4p
NRC-9107
Availability: Published in Journal of Physical Chemistry v70 n8 p2689-91 Aug 1966.

Descriptors: (*Hydrates, Clathrate compounds), (*Clathrate compounds, Crystallography), X-ray diffraction analysis, Crystal lattices, O-heterocyclic compounds, Molecular association, Dielectric properties, Canada

The paper establishes the structure of and presents lattice parameter measurements for five clathrate hydrates not previously characterized by X-ray examination. The work was undertaken to see if the observed lattice parameters might be correlated with the size of the guest molecule or with the frequencies of the dielectric absorption.

AD-640 961 **Field 20B, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
NEW ELECTRON BEAM OPTICS FOR THE PREPARATION OF INSULATING CRYSTALS BY THE FLOATING ZONE METHOD.
Instrumentation papers,
by Charles E. Ryan, Dennis P. Considine, John J. Hawley, and Robert C. Marshall. Aug 66, 27p
AFCRL-66-539, AFCRL-IP-110
Proj. AF-5620
Task 562006

Descriptors: (*Electron beam melting, Zone melting), (*Crystal growth, *Zone melting), (*Single crystals, Refractory materials), Electrodes, Configuration, Optics.

The problems involved in the preparation of single crystals of refractory insulating materials are briefly outlined. The current status of the preparation of insulating crystals by the electron beam heated floating-zone method is reviewed, and the disadvantages are noted. The conception, construction and test of a new electron beam optics are described, and the advantages are pointed out. Sapphire, ruby and tungsten rods were zoned in testing the new optics. The influence of zone length, liquid - solid interface geometry, foreheater and afterheater temperature, and mechanical translation and rotation systems on crystal perfection are discussed. (Author)

AD-641 000 **Field 20B, 20L**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
CRYSTALLOGRAPHIC STUDY OF CHROMIUM SPINELS,
by P. M. Raccah, R. J. Bouchard, and A. Wold.
1966, 3p MS-1477
Contract AF 19 (628)-5167, Grant NSF-GP-5037
ESD-TR-66-224
Availability: Published in Journal of Applied Physics v37 n3 p1436-7 Mar 1 1966.

Descriptors: (*Chromium compounds, Spinels), (*Spinels, Crystallography), X-ray diffraction analysis, Programming (Computers), Sulfur compounds, Selenium compounds, Manganese compounds, Iron compounds, Cobalt compounds, Copper compounds, Zinc compounds, Cadmium compounds.

Identifiers: Chromites, Selenochromites, Thiochromites.

Several chromium spinels were prepared and regular x-ray diffraction intensities were measured on the powders. A Fortran program was developed in order to process the data. It appeared that the results, so obtained, were comparable to those from neutron diffraction techniques. A plot of the U parameter versus a0 for the thiochromites shows that metallic CuCr2S4 is exceptional. For its value of U, it has a much lower a0 than would be expected from a comparison of Mn, Fe, Co, and Zn thiochromites. (Author)

AD-641 029 **Field 20B**
CFSTI Prices: HC$2.00 MF$0.50
Universidad Nacional de Cuoya, San Carlos de Bariloche (Argentina). Instituto de Fisica.
THE MECHANISM OF WORK-HARDENING IN F. C. C. CRYSTALS.
Final rept., 17 Sep 63-16 Aug 66,
by Gunther Schoeck, and Ricardo Medrano. Jul 66, 32p
Grant DA-ARO-49-092-64-G27
Proj. DA-20014501B32D-00-001-LA

Descriptors: (*Crystals, Hardening), Metals, Theory, Deformation, Crystal lattice defects, Single crystals, Heat of activation.

The report gives the results of a theoretical and experimental investigation on the work-hardening mechanism in face centred cubic metals. In the theoretical part some of the existing theories of work-hardening were critically analysed.

AD-641 126 **Field 20B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash.
SURFACE OXIDE FILMS AND THE LIFE TIME OF VACANCIES IN THIN CRYSTALS,
by A. Eikum, and G. Thomas. Aug 66, 15p D1-82-0561

Descriptors: (*Crystals, Crystal lattice defects), (*Films, Oxides), Surfaces, Aluminum alloys, Magnesium alloys, Aluminum, Foils, Life expectancy, Annealing.

During annealing experiments in the electron microscope, prismatic dislocation loops and helices have been observed to grow in thin foils prepared from quenched and aged samples of supersaturated aluminum-magnesium alloys. Growth in pure aluminum or dilute aluminum-magnesium alloys has not been reported. It has been suggested recently that the excess vacancies required for growth are residual quenched-in vacancies which were not able to sink at external surfaces due to the presence of an impervious oxide film. The oxide mechanism fails to account for the fact that growth has not been observed in pure aluminum and dilute aluminum alloys. This point and others concerning the life time of vacancies in thin crystals are discussed. (Author)

AD-641 198 **Field 20B, 20L, 9A**
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Orlando, Fla.
RESEARCH ON OPTICAL PROPERTIES OF SINGLE CRYSTALS OF BETA PHASE SILICON CARBIDE.
Summary technical rept. 5 May 65-5 Jun 66,
by P. B. Pickar, J. S. Ziomek, and H. D. Tiller.
Oct 66, 90p OR-8394
Contract DA-28-017-AMC-2002 (A)

Descriptors: (*Single crystals, Silicon compounds), (*Silicon compounds, Carbides), Optical properties, Diodes (Semiconductor), Electroluminescence, Photoelectric effect, Radiation damage, Absorption spectrum, Spectra (Infrared), Spectra (Visible + ultraviolet), Cryogenics.

Identifiers: Silicon carbide.

The report describes research work on beta silicon carbide. The work included: (1) the electroluminescent spectra of point contact and alloyed junction diodes under forward and reverse bias in the visible and near infrared region; (2) square and sine wave modulation of this electroluminescence; (3) photostimulated emission at liquid nitrogen temperature under ultraviolet pumping; (4) absorption spectra in the visible and near infrared region at several different temperatures; (5) reflection spectra at room temperature at two angles of incidence. (Author)

AD-641 221 **Field 20B, 20L**
Not available from CFSTI.
Texas Univ., Austin. Dept. of Chemical Engineering.
THE CRYSTAL STRUCTURE OF LANTHANUM TELLURIDE AND TELLURIUM-DEFICIENT NEODYMIUM TELLURIDE.
Interim rept.,
by R. Wang, H. Steinfink, and W. F. Bradley. 12 Jul 65, 5p
Grant AF-AFOSR-806-65
Proj. AF-9761
Task 976102
AFOSR-66-1660
Availability: Published in Inorganic Chemistry v5 n1 p142-5 Jan 1966.

Descriptors: (*Tellurides, Crystal structure), (*Lanthanum compounds, Tellurides), (*Neodymium compounds, Tellurides), X-ray diffraction analysis, Crystal lattices, Electrical properties, Resistance (Electrical).

Identifiers: Lanthanum tellurides, Neodymium tellurides.

Single crystal X-ray diffraction studies of LaTe2 and NdTe2 and of the related tellurium-deficient compositions have confirmed the isomorphism with Fe2As (C 38). Two different types of tellurium atoms exist in the structure. The atoms in the basal plane are essentially metallic in nature and give rise to the observed electrical properties. These are the atoms which can be removed from the structure to produce the tellurium-deficient compositions. This explains the increased electrical resistivity as well as the decrease in the length of the a axis and the increase in the length of the c axis observed for these compounds. (Author)

AD-641 300 **Field 20B**
Not available from CFSTI.
Pittsburgh Univ., Pa. Dept. of Physics.
MEASUREMENT OF THE LATTICE CONSTANT IN THE DIHYDRIDES OF GADOLINIUM-YTTRIUM ALLOYS,
by David L. Uhrich. 29 Oct 65, 2p
Grant AF-AFOSR-196-63
Proj. AF-9761
Task 976101
AFOSR-66-1234
Availability: Published in The Journal of Chemical Physics v44 n5 p2202-3 Mar 1 1966.

Descriptors: (*Rare earth compounds, *Crystal lattices), Complex compounds, Hydrides, Gadolinium compounds, Yttrium compounds, Measurement, X-ray diffraction analysis.

The lattice parameters of several compounds of the approximate composition GdxY1-xH2 were determined at room temperature using x-ray diffraction techniques. A GE XRD-3 diffractometer, employing Ka radiation from a molybdenum tube, was used. The x-ray spectra were displayed on a strip chart, which was calibrated with the lines from finely powdered NaCl. (Author)

N66-30848 **Field 20B**
CFSTI Prices HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
STUDY OF GROWTH PARAMETERS FOR REFRACTORY CARBIDE SINGLE CRYSTALS QUARTERLY STATUS REPORT NO. 9, 1 MAR. -1 JUN. 1966.
by R. W. Bartlett. 27 Jun 66, 17p NASA-CR-76365
Contract NASR-49/19/

Descriptors: *Carbide, *Crystal growth, *Refractory metal, *Single crystal, Arc, Crystal, Growth, Hafnium, Liquid, Melting, Metal, Parameter, Refractory, Single, Solution, Tantalum, Verneuil technique.

For abstract, see STAR 04 17.

ORNL-3979 **Field 20B**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
METHODS OF REDUCTION OF TEXTURE DATA TO INVERSE POLE FIGURES,
by R. O. Williams. Aug 66, 26p
Contract W-7405-eng-26

Descriptors: (*Grain structures (Metallurgy), Experimental data), (*Crystallography, Grain boundaries).

For abstract, see NSA 20 21.

AD-461 079 See Field 11F

AD-640 639 See Field 13H

AD-640 744 See Field 11F

AD-640 952 See Field 7B

AD-640 999 See Field 20L

AD-641 203 See Field 20K

AD-641 241 See Field 11F

AD-641 299 See Field 11F

20C. ELECTRICITY AND MAGNETISM

AD-640 535 **Field 20C, 11F**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
MEASURED RELAXATION TIMES FOR THE UNIAXIAL-ANISOTROPY SPECTRUM IN NON-MAGNETOSTRICTIVE PERMALLOY FILMS,
by Donald O. Smith, Gerald P. Weiss, and Kenneth J. Hartz. Nov 65, 3p MS-1472
Contract AF 19 (628)-5167
ESD-TR-66-220
Availability: Published in Journal of Applied Physics v37 n3 p1464-5 Mar 1 1966.

Descriptors: (*Films, Relaxation time), (*Magnetic alloys, Films), Magnetic properties, Heat of activation, Anisotropy, Measurement.

The relaxation time tau for realignment of an atomic anisotropy by 90 degrees has been measured for a number of fast processes tau <1000 sec occurring in nonmagnetostrictive Permalloy films. The method of measurement utilizes the magnetoresistance effect and is described in detail elsewhere. For films deposited between 23 and 200C at 1,000,000 to 100,000 Torr and measured at the same temperature and pressure, three distinct processes plus two probable ones have been found, which together account for abolut one-quarter of the total anisotropy. The activation energy Q and period factor tau sub o which determine the relaxation time tau = tau sub o exp (Q/kT) have been determined for each of these processes. (Author)

AD-640 536 **Field 20C**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
THEORY OF LARGE-ANGLE RIPPLE IN MAGNETIC FILMS,
by Kenneth J. Harte. Nov 65, 3p MS-1467
Contract AF 19 (628)-5167
ESD-TR-66-217
Availability: Published in Journal of Applied Physics v37 n3 p1295-6 Mar 1 1966.

Descriptors: (*Films, *Magnetism), Theory, Magnetic alloys, Magnetic properties, Nickel alloys, Iron alloys.

Identifiers: Permalloy.

The paper discusses the longitudinal magnetostatic force and its effects on the ripple, in particular on the ripple spectrum, magnetization dispersion, ripple 'wall' spacing as observed by Lorentz microscopy, and spin-wave reaction torque in high-speed switching. The results of the theory is given and compared with the corresponding results of the linear theory.

AD-640 844 **Field 20C, 11B**
Not available from CFSTI.
Minnesota Univ., Minneapolis. School of Mineral and Metallurgical Engineering.
THE SUPERCONDUCTING BEHAVIOR OF SEVERAL COMPLEX CARBIDES AND NITRIDES.
Interim rept.,
by L. E. Toth, W. Jeitschke, and C. M. Yen. 24 Jul 65, 5p
Grant AF-AFOSR-1012-66
Proj. AF-9763
Task 976302
AFOSR-66-1647
Availability: Published in Journal of the Less-Common Metals v10 p29-32 1966.

Descriptors: (*Carbides, Superconductivity), (*Nitrides, Superconductivity), Complex compounds, Transition elements, Cryogenics, Phase studies, Transition temperature.

The superconducting behavior of several complex transition metal carbide and nitride phases has been determined. For a representative sampling of a large group of isotypic H-phases no superconducting transitions were observed to 1.1 degrees K. The beta-Manganese nitride Niobium Aluminum Nitride has been found to be superconducting at 1.3 degrees K confirming a previous result that the filled and ordered Beta-Manganese crystal structure is favorable for superconductivity. (Author)

AD-640 849 **Field 20C**
Not available from CFSTI.
Wayne State Univ., Detroit, Mich. Dept. of Physics.
ANOMALOUS ULTRASONIC ATTENUATION IN SUPERCONDUCTING SINGLE-CRYSTAL Hg,
by R. L. Thomas, H. C. Wu, and N. Tepley. 25 Apr 66, 5p
Grant AF-AFOSR-695-66
Proj. AF-9763
Task 976302
AFOSR-66-1790
Availability: Published in Physical Review Letters v17 n1 p22-4 Jul 4 1966.

Descriptors: (*Mercury, Superconductivity), Ultrasonic radiation, Attenuation, Single crystals, Measurement.

The paper describes apparent anomalies in the bulk superconducting properties of oriented single-crystal Hg measured by ultrasonic techniques.

AD-640 853 **Field 20C, 20J**
CFSTI Prices: HC$3.00 MF$0.50
Case Inst. of Tech., Cleveland, Ohio.
ELECTROMAGNETIC RADIATION IN A MOVING CONDUCTING MEDIUM: FIRST-ORDER THEORY,
by Ioannis M. Besieris. Jun 66, 53p Scientific-13
Contract AF 19 (628)-1699
Proj. AF-5635
Task 563501
AFCRL-66-469

Descriptors: (*Electromagnetism, Relativity theory), Potential theory, Green's function, Harmonic analysis, Conductivity.

The primary objective of the investigation was to examine the electromagnetic radiation resulting from sources of arbitrary time dependence in a homogeneous, isotropic, conducting medium of infinite extent. The material is assumed to be moving at a uniform velocity with respect to the rest frame of the source distribution. To avoid excessive difficulties in the ensuing development, only the nonrelativistic approximation situation was considered. Because no solution to this problem could be found in the literature, it was considered worthwhile to find the modification of the character of the radiation due to the presence of conductivity. It is determined first that the electromagnetic field intensities referred to the laboratory system are expressible in terms of a pair of scalar and vector potential functions satisfying symmetric hyperbolic partial differential equations of the second order with respect to time and space coordinates. This is made possible by invoking a generalized Helmholtz theorem, and specifying a new type of Lorentz condition. Ordinarily, one would proceed to solve for the time-dependent Green's function associated with the potential equations by using both time and space Fourier transformations. Instead of following this classical approach, however, the author introduced an alternative method which is based on the fact that there exists a relation between the fundamental solution of a radiation problem and that of a corresponding Cauchy initial-value problem.

AD-640 990 **Field 20C, 14B**
CFSTI Prices: HC$3.00 MF$0.75
Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.

IMPLEMENTATION OF POYNTING VECTOR MEASUREMENTS.
Final rept. 1 Jan 65-7 Jul 66,
by W. W. Cowles, N. Farhat, and R. M. Showers.
31 Aug 66, 63p MSEE-67-05
Contract NBy-32219

Descriptors: (*Electromagnetic fields, Measurement), Measuring devices (Electrical + electronic), Design, Construction, Tests.

Identifiers: Poynting vector.

This report covers the design, construction, and field testing of an experimental device capable of measuring the magnitude of the Poynting vector associated with an electromagnetic field. With mechanical manipulation, it can determine the direction of the Poynting vector. It is based upon theory which has been described previously. Tests of the final device demonstrate that it is capable of measuring this quantity with reasonable accuracy. The major limitations on its use result from the necessity for obtaining an accurate phase calibration of the two separate channels used for amplifying the signals received respectively on the rod and the loop antenna. Interaction between the rod and the loop does not seem to be a significant problem. The device has unique characteristics and a number of applications for it are indicated. Recommendations on improvements in the device which are desirable for general field use are included. (Author)

AD-641 166 **Field 20C, 20A**
Not available from CFSTI.
Maryland Univ., College Park.
ELECTROMAGNETIC ATTENUATION OF TRANSVERSE ULTRASOUND IN SUPERCONDUCTORS,
by James R. Cullen, and Richard A. Ferrell. 7 Jul 65, 6p
Grant AF-AFOSR-735-65
Proj. AF-9761
Task 976101
AFOSR-66-1607
Availability: Published in The Physical Review v146 n1 p282-5 Jun 3 1966.

Descriptors: (*Superconductors, Ultrasonic radiation), Attenuation, Electromagnetic fields, Transition temperature, Ultrasonic properties.

The electromagnetic field set up by a transverse sound wave in a superconductor is screened out by the Meissner effect at temperatures below the transition temperature. Consequently the attenuation produced by electromagnetic coupling to the quasiparticles undergoes an abrupt decrease below the transition temperature. At sufficiently high frequencies the wavelength is short enough that this 'rapid fall' is spread out over an appreciable temperature range. Thus measurements of the rapid fall in electromagnetic attenuation can provide a test for theories of the temperature dependence of screening in the superconducting state. Such measurements would have an advantage over the usual penetration-depth measurements in that they would study the response of the superconductor to a pure sinusoidal wave and not to an integrated superposition of such waves. But the analysis of the data requires a reliable theoretical expression for the transverse conductivity in the superconducting state. This is computed in the present paper from the BCS theory along straightforward conventional lines. It is noted that the relevent coherence factors are the same as in the problem of nuclear spin relaxation, and that a logarithmic divergence due to the confluence of the singular density-of-states functions also enters in the present problem. In the present case this divergence is cut off by the finite frequency of the quasiparticle transition. (Author)

AD-641 231 **Field 20C, 20L**
Not available from CFSTI.
Battelle Memorial Inst., Columbus, Ohio.
GREEN'S-FUNCTION THEORY OF FERRIMAGNETISM, WITH AN APPLICATION TO MAGNETITE.
Interim rept.,
by Roger E. Mills, Richard P. Kenan, and Frederick J. Milford. 2 Dec 65, 16p
Grant AF-AFOSR-868-65
Proj. AF-9761
Task 976101
AFOSR-66-1822
Availability: Published in The Physical Review v145 n2 p704-17 May 13 1966.

Descriptors: (*Magnetism, *Green's function), (*Magnetite, Magnetic properties), Ferrites, Mathematical models, Theory, Crystal substructure, Crystal lattices, Nuclear spins, Transition temperature.

Identifiers: Curie point, Ferrimagnetism, Magnons.

A Green's-function theory of magnetic properties of an n-sublattice ferrimagnet is derived in the random-phase approximation. The magnitude and relative orientation of the sublattice magnetizations, the renormalized magnon spectra, the zero-point motion and the Curie temperature as functions of the spin magnitudes, the exchange constants and the geometry are derived. These properties were computed for magnetite. It is concluded that magnitudes of the exchange constant (JAB) between sites of tetrahedral and octahedral coordination of about 0.0025 eV above 119K, and about 0.001 eV below that temperature, are consistent with present experimental data for magnetite. (Author)

AD-641 232 **Field 20C, 20J**
Not available from CFSTI.
Battelle Memorial Inst., Columbus, Ohio.
PERTURBATION EXPANSION FOR THE MAGNETIZATION OF THE SPIN 1/2 ANTIFERROMAGNET.
Interim rept.,
by R. P. Kenan. 1966, 4p
Grant AF-AFOSR-868-65
Proj. AF-9761
Task 976101
AFOSR-66-1741
Availability: Published in Journal of Applied Physics v37 n3 p1453-4 Mar 1 1966.

Descriptors: (*Antiferromagnetism, *Perturbation theory), Nuclear spins, Crystal substructure, Fermions, Operators (Mathematics), Bosons, Crystal lattices, Integral equations, Field theory, Quantum mechanics.

A perturbation expansion of the sublattice magnetization of a spin 1/2 antiferromagnet is developed. The theory proceeds from a Fermion representation of the spin operators for spin 1/2, in which an auxilliary (drone) set of Fermi operators is introduced to account for the boson character of spin operators attached to different lattice sites. The development of the present theory is parallel to that derived earlier by Mills, Kenan, and Korringa, with the role of the 'contracted lines' of the earlier theory being played by the drone lines of the present theory. Integral equations are derived for the single-particle spin propagator. A resummation over a class of graphs contributing to the kernel, which gives the spin-wave result at low temperatures, is outlined. (Author)

N66-30685 **Field 20C**
CFSTI Prices HC$1.00 MF$0.50
Weizmann Inst. Of Science, Rehovoth (Israel). Dept. Of Electronics.
FIELD DEPENDENCE OF THE SPONTANEOUS MAGNETIZATION IN A HEISENBERG UNIAXIAL FERROMAGNET.
by S. Alexander, and S. Shtrikman. 15 Dec 65, 19p TN-21, AD-632764
Contract AF 61/052/-654

Descriptors: *Ferromagnetism, *Field theory, *Heisenberg theory, *Magnetization, *Spin wave, Approximation, Cubic, Dependence, Field, Physics, Solid, Spin, Spontaneous, State, Theory, Uniaxial, Wave.

For abstract, see STAR 04 17.

N66-30720 **Field 20C**
CFSTI Prices HC$1.00 MF$0.50
Weizmann Inst. Of Science, Rehovoth (Israel). Dept. Of Electronics.
THE CRITICAL BEHAVIOR OF A WEAK FERROMAGNET.
by G. Gorodetsky, S. Shtrikman, and D. Treves. 15 Jan 66, 12p TN-23, AD-632765
Contract AF 61/052/-654

Descriptors: *Ferromagnetism, *Magnetic material, *Temperature effect, Behavior, Critical, Dependence, Effect, Exponent, Field, Magnetic, Material, Physics, Region, Solid, State, Temperature, Theory, Weak.

For abstract, see STAR 04 17.

N66-32640 **Field 20C**
CFSTI Prices HC$2.50 MF$0.50
California Univ., Los Angeles. Inst. Of Geophysics And Planetary Physics.
VARIATIONS IN THE INTERPLANETARY MAGNETIC FIELD - MARINER 2. PART 3 - SOME EFFECT UPON SOLAR COSMIC RAYS.
by P. J. Coleman Jr. 12 May 66, 53p NASA-CR-76944
Grant NSG-249
Its Publ.-514

Descriptors: *Interplanetary magnetic field, *Mariner ii space probe, *Solar cosmic ray, Flare, Interplanetary, Magnetic, Model, Orientation, Proton, Ray, Scattering, Solar, Variation.

For abstract, see STAR 04 17.

N66-37577 **Field 20C**
CFSTI Prices HC$1.00 MF$0.50
Michigan Univ., Ann Arbor. Radiation Lab.
TOPICS IN ELECTRODYNAMICS OF MOVING MEDIA FINAL REPORT, 1 MAY 1965 - 1 MAY 1966.
by R. M. Kalafus, V. Pyati, and C. T. Tai. May 66, 25p NASA-CR-78393
Contract NGR-23-005-107
Its Rept.-7322-1-f

Descriptors: *Conducting medium, *Electrodynamics, *Isotropic medium, *Magnetoelectric medium, Antenna, Cerenkov radiation, Dielectric, Dipole, Drift, Green function, Index, Lossless, Magnetoionics, Medium, Moving, Oscillation, Plasma, Radiation, Refraction, Theory.

For abstract, see STAR 04 22.

AD-640 771 **See Field 20B**

AD-640 935 **See Field 20J**

AD-641 036 **See Field 20L**

AD-641 090 **See Field 20F**

AD-641 094 **See Field 20L**

AD-641 143 **See Field 11G**

AD-641 281 **See Field 20H**

20D. FLUID MECHANICS

AD-450 031 **Field 20D**
CFSTI Price: HC$5.60
Defense Research Lab., Univ. of Texas, Austin.
SUMMARY OF STUDIES ON THE MEASUREMENT OF LOCAL SKIN FRICTION BY MEANS OF THE SURFACE IMPACT OR PRESTON TUBE,

by J. C. Westkaemper, and Oliver Hill. 18 Feb 64, 55p DRL-513, CR-9
Contract NOrd-16498
Task UTX-2

Descriptors: (*Friction, Measurement), (*Turbulent boundary layer, Friction), Guided missiles, Surfaces, Surface properties, Turbulence, Compressible flow, Incompressible flow, Pressure, Adiabatic gas flow, Impact shock, Aerodynamic heating, Theory, Numerical analysis, Experimental data, Aerodynamic configurations.

This report summarizes work doe on the use of the surface impact probe, or Preston tube, method of measuring skin friction in turbulent, compressible boundary layers. The theory for incompressible flow was extended to the case of adiabatic, compressible flow, and the extended theory was experimentally shown to be valid. It has also been demonstrated that the extension is applicable to adiabatic flow with moderate adverse pressure gradients. Experimental and theoretical efforts to apply the impact probe method to compressible flows with moderate, aerodynamic heating were only partially successful. (Author)

AD-464 615 **Field 20D**
CFSTI Price: HC$6.60
Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
AN ASPECT OF THE PROPELLER-SINGING PHENOMENON AS A SELF-EXCITED OSCILLATION,
by Jumpei Shioiri. Mar 65, 61p Rept. no. 1059
Contract Nonr-263 (52)
Projs. S-R009-01-01, DL-2661/056

Descriptors: (*Propellers (Marine), Oscillation), Vortices, Propeller blades, Stability, Vibration, Hydrodynamics, Mathematical analysis.

A model for the propeller-singing phenomenon considered as a self-excited oscillation is presented to interpret the finding of a recent experimental work; viz., that, although the singing frequency roughly obeys the well-known Strouhal relation, once the strong singing state has been established, the frequency is kept constant through a fairly wide range of flow velocity, and consequently the frequency-versus-velocity diagram exhibits step and jump characteristics. The model presented is a closed loop composed of a blade, as a mechanical-vibration system, and the Karman vortex-shedding mechanism; the blade vibration controls the shedding mechanism, and the hydrodynamic reaction of shed vortices sustains the blade vibration. The control imposed by the blade vibration upon the vortex shedding actually implies the synchronization of the latter with the former. The model which simulates the vortex-shedding mechanism is essentially a simplified mathematical expression for the disintegration process of the vortex sheets shed from the separation points into the rows of discrete vortices. The stability criterion derived for the synchronized run of the shedding mechanism, together with the positive-work criterion imposed upon the phase relation between the blade vibration and the hydrodynamic reaction of the shed vortices, gives a reasonable interpretation for the step and jump characteristics. (Author)

AD-640 611 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Silver Spring Md. Applied Physics Lab.
NUMERICAL CALCULATION OF THE TURBULENT MIXING OF TWO UNIFORM GAS FLOWS,
by P. P. Koryavov. 22 Sep 66, 29p TG-230-T501
Contract NOw-62-0604
TT-66-62474
Trans. of Zhurnal Vychislitelnoi Matematiki i Matemticheskoi Fiziki, v4 n3 p495-511 1964.

Descriptors: (*Turbulence, Gas flow), Numerical analysis, Boundary layer, Compressible flow, Laminar flow, Boundary value problems.

On the basis of the approximate boundary-layer theory an investigation is made of the problem of turbulent mixing of two uniform flows of a compressible fluid for Prandtl numbers different from one with particular attention to the temperatures and velocities of the mixing flows. The equations of turbulent mixing are reduced to the equations of laminar mixing using some new independent variables. It is shown that introduction of these new variables permits separation of the boundary-value problem for flow in the mixing zone, which involves certain mathematical difficulties, from that of calculating temperature and velocity profiles for actual cross sections, which is not difficult mathematically but requires the use of empirical quantities. (Author)

AD-640 627 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
New York Univ., N. Y. Dept. of Aeronautics and Astronautics.
A REVIEW OF SOME PROBLEMS IN TURBULENT MIXING.
Interim rept.,
by Herbert Fox, Victor Zakkay, and Ram Sinha.
Sep 66, 68p NYU-AA-66-63
Contract DA-31-124-ARO (D)-259
Proj. DA-20014501B33G
Task 1150
AROD-5020:3

Descriptors: (*Turbulence, Wake), Transport properties, Flow fields, Reviews, Diffusion, Jet mixing flow.

A critical review of turbulent far wake experiments is presented. All the available data at M = 3, 3.89, 5, 11.18 are surveyed with a view to prediction of transport properties. There are indicated considerable difficulties in finding a single diffusion model adequate to describe the flow field. (Author)

AD-640 633 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Wigley (C.) London (England).
THE EFFECT OF FLUID VISCOSITY ON WAVE RESISTANCE USING A MODIFICATION OF LAURENTIEFF'S METHOD - A MORE ACCURATE CALCULATION.
Technical rept.,
by C. Wigley. May 66, 49p
Contract N62558-4527
Proj. NR-062-211

Descriptors: (*Fluids, Viscosity), Numerical analysis, Boundary layer, Hulls (Marine), Tables, Motion, Great Britain.

A new calculation was made at four speeds for the same form of hull as in an earlier report, but to a much higher degree of accuracy. This calculation is described, and its results are given. (Author)

AD-640 677 **Field 20D**
Not available from CFSTI.
Politecnico di Torino (Italy). Istitute di Meccanica Applicata.
AN EXPERIMENTAL INVESTIGATION OF BOUNDARY LAYER WITH ADVERSE PRESSURE GRADIENT,
by Ennio Mattioli. 1962, 11p
Contract AF 61 (052)-51
Availability: Published in Proceedings of the International Council of the Aeronautical Sciences Congress (3rd), Stockholm p379-89 1962.

Descriptors: (*Boundary layer, Test facilities), Wind tunnels, Italy, Pressure, Turbulence.

A test chamber was manufactured having rectangular cross section with a shutter covering having controllable opening. Two slots in the side walls allow continuous detections along the whole 'floor.' Measures of turbulent intensity and of intermittence factor are reported. Between the free stream and the turbulent boundary layer, each with its own level of turbulence, there is an intermittence layer, not revealed by the Pitot tube. (Author)

AD-640 701 **Field 20D**
CFSTI Prices: HC$1.60 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
ON THE CHARACTERIZATION OF FIELDS OF DIABATIC FLOW. PART I. GENERAL THEORY OF STEADY DIABATIC FLOW,
by B. . Hicks. 10 May 47, 18p Rept. no. 633-Pt-1

Descriptors: (*Compressible flow, Theory), Vector analysis, Potential theory, Heat transfer, Partial differential equations, Equations of motion.

Identifiers: Diabatic flow.

The vector representations of fields of steady, rotational, diabatic compressible flow are first studied in order to find that representation which is most efficient. Diabatic flows are then introduced which are irrotational in the sense that the velocity is a compound lamellar vector. These flows are characterized in terms of their character and form, specified respectively by the function g (N) and the form function F (phi sub N) which occurs in the partial differential equation for the potential function phi sub N. The type of the differential equation for phi sub N is found to depend only upon the flow character which in addition fixes the relationship between the heat addition function q sub N, the geometry of the stream tubes and the form function. (Author)

AD-640 729 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
INFLUENCE OF THE LAMINAR BOUNDARY LAYER IN THE FLOW PAST A THIN BLUNTED CONE AT HIGH SUPERSONIC VELOCITIES,
by I. N. Murzinov. 18 Apr 66, 9p FTD-TT-65-1118
TT-66-62500
Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie, n1 p152-3 1961.

Descriptors: (*Conical bodies, Supersonic flow), (*Blunt bodies, Supersonic flow), (*Laminar boundary layer, *Supersonic flow), USSR, Pressure, Distribution.

In the flight of thin blunted bodies in the atmosphere at great altitudes, an influence on the distribution of the pressure over the generatrices is exerted by the blunting and also by the thickened boundary layer. This influence is examined by the method of small disturbances with high flight Mach numbers.

AD-640 754 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
NONEQUILIBRIUM SUPERSONIC AIRFLOW AROUND A SPHERE,
by V. P. Stulov, and G. F. Telein. 27 Jun 66, 32p
FTD-MT-65-321
TT-65-14559
Edited machine trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika, n1 p3-16 1965.

Descriptors: (*Spheres, Supersonic flow), (*Supersonic flow, Nonequilibrium flow), USSR, Thermodynamics, Numerical analysis, Shock waves.

Results are given of numerical solution of a problem concerning nonequilibrium supersonic airflow

around a sphere. The problem was solved by the method developed in application to the calculation of supersonic flow of gas with arbitrary thermodynamic properties of prescribed form around blunted bodies.

AD-640 764 **Field 20D, 13I**
Not available from CFSTI.
Waterloo Univ. (Ontario). Dept. of Mechanical Engineering.
ANALYTICAL THEORY OF SECONDARY FLOW IN A CENTRIFUGAL IMPELLER,
by J. H. G. Howard. 1966, 10p
Grant DRB-9550-19
Availability: Published in A.S.M.E-E.I.C. Fluids Engineering Conference, Denver, Colorado, April 25-27, 1966.

Descriptors: (*Secondary flow, *Impellers), Centrifugal fields, Vortices, Compressible flow, Equations of motion, Viscosity, Entropy, Boundary layer, Canada.

The relationship for the development of secondary vorticity for a compressible fluid in a rotating reference frame is presented as an extension of earlier analyses. Compressibility adds a density gradient term to the kinematic relationship for the growth of absolute vorticity in the direction of the relative velocity. However, the term disappears if the equation is expressed in terms of the circulation about a streamtube. The effects of compressibility, viscosity and entropy gradients on the associated equation of motion are also investigated. The vorticity growths due to distributed whirl velocities and boundary layers at the entry to sample impeller passages are estimated by a one-dimensional calculation method which may be extended to include other sources of secondary vorticity generation. (Author)

AD-640 765 **Field 20D**
Not available from CFSTI.
McGill Univ., Montreal (Quebec). Mechanical Engineering Research Labs.
A WIND TUNNEL INVESTIGATION OF A THIN AEROFOIL WITH A SHARP LEADING EDGE, AND BLOWING APPLIED AT THE MID-CHORD AT TWO ANGLES RELATIVE TO THE SURFACE,
by I. Wygnanski. 2 Aug 65, 8p
Grant DRB-9551-12
Availability: Published in Journal of the Royal Aeronautical Society v70 n666 p665-9 Jun 1966.

Descriptors: (*Airfoils, Aerodynamic characteristics), Wind tunnels, Leading edge, Bubbles, Moments, Jets, Canada.

Experiments were made on a thin two-dimensional aerofoil with sharp leading edge and with a jet blowing through a mid-chord slot on the upper surface in order to control the boundary layer and circulation around it. The measurements were made at low Mach number. The effect of changing the angle of blowing was studied in anticipation that this would help to control the leading edge separation bubble. It transpired that variation of the blowing angle caused little change in lift coefficient but produced an appreciable change in moment coefficient. A low pressure separation bubble was formed downstream of the slot with the jet discharging at an angle and subsequently re-attaching to the surface. This reduced the nose-up pitching moment about the quarter-chord point. The experimental results are in fair agreement with the 'jet-flap' and jet entrainment theory. (Author)

AD-640 907 **Field 20D**
CFSTI Prices: HC$4.00 MF$0.75
Notre Dame Univ., Ind. Dept. of Aero-Space Engineering.
A COMBINED VISUAL AND HOT-WIRE ANEMOMETER INVESTIGATION OF BOUNDARY LAYER TRANSITION.
Final rept.,
by C. F. Knapp, P. J. Roache, and T. J. Mueller. Aug 66, 101p UNDAS-TR-866CK
Contract Nonr-1623 (17)
Proj. SR-009-01-01

Descriptors: (*Boundary layer transition, Scientific research), Anemometers, Ogives, Cylindrical bodies, Subsonic flow, Flow visualization, Photographic techniques, Smokes.

The results of a wind tunnel study of the structure of boundary layer transition on an ogive nose cylinder alined parallel to the flow are presented. Both natural and forced transition in both a zero and an adverse pressure gradient are studied at subsonic speeds by means of the visual (smoke) technique. In the visual technique, both still pictures and high speed (4000 frames per second) motion picture films are used. Natural transition is shown to differ from forced transition (using acoustic excitation to control the wave frequencies) in several aspects. Natural transition is intermittent, while forced transition is continuous. The vortex truss structures tend to be staggered in a thatched pattern in natural transition, but tend to be alined in rows in forced transition. In natural transition, the initially two-dimensional waves break down in sets, simultaneously, whereas in forced transition the individual waves break down successively upon reaching a fixed axial position. An adverse pressure gradient tends to produce a transition structure similar to that of forced transition. It is also shown that sound of a very low frequency can control, rather than eliminate, intermittency. Lastly, the use of a hot wire anemometer probe immersed directly in the smoke flow was shown to be a valuable research tool for the correlation of visual and hot wire anemometer data. (Author)

AD-640 975 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C.
SURFACE WAVES GENERATED BY SUBMERCED RANKINE OVOIDS STARTING FROM REST.
Final rept.,
by D. A. Shaffer. Sep 66, 35p DTMB 2225
Projs. ONR-PO-5-0065, ONR-PO-6-0062

Descriptors: (*Water waves, Measurement), (*Towed bodies, Water waves), Underwater objects, Surfaces, Wake, Turbulence, Stagnation point.

Two Rankine ovoids were towed beneath the surface of a large body of water at several speeds and depths. The surface disturbance was measured both on and off the centerline of travel. The results of these tests were then compared with existing theoretical wave height predictions. (Author)

AD-641 082 **Field 20D, 9B, 13I**
CFSTI Prices: HC$2.00 MF$0.50
Mechanical Technology, Inc., Latham, N. Y.
SOME COMPUTER RESULTS IN THE DIRECT ITERATION SOLUTION OF THE ELASTOHYDRODYNAMIC EQUATIONS.
Technical rept.,
by R. J. Wernick. Feb 63, 29p MTI-62TR38, MTI-23 (1-63)
Contract Nonr-3729 (00)

Descriptors: (*Programming (Computers), *Equations of motion), (*Lubrication, *Bearings), Elasticity, Hydrodynamics, Deformation, Iterative methods.

Identifiers: Elasto-hydrodnamic problem.

Results of a computer program to solve the elastohydrodynamic equations are presented. The method of solution is applicable to moderately loaded cases. The results check and extend previously published isothermal cases. Also included is a highly accurate method for calculating film thickness profiles, correcting a previous erroneous method. The flexibility of the program permits its further use in obtaining solutions of the elastohydrodynamic equations including thermal effects. (Author)

AD-641 087 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C.
CALCULATIONS ON THE COLLAPSE OF A SPHERICAL GASFILLED CAVITY IN A COMPRESSIBLE LIQUID.
Final rept.,
by Russel R. Lilliston. Aug 66, 44p DTMB-2223
Proj. SP-6-0002

Descriptors: (*Bubbles, Cavitation), (*Cavitation, Liquids), Pressure, Velocity, Acceleration, Gases, Numerical analysis, Differential equations, Programming (Computers), Shock waves, Spheres.

The paper presents a method for calculation the instantaneous pressure, velocity, accerleration, and radius associated with the collapse of a spherical gas-filled cavity in an infinite compressible liquid. The method is an independent approach which makes use of Hamming's technique to numerically integrate Gilmore's differential equations which describe the collapse. Included is a computer program which will perform the necessary calculation on a IBM 7090/1401 digital computer. It may be inferred that the peak shock wave pressure is significantly reduced by a decrease in ambient pressure, an increase in internal pressure, and/or a variation of the specific heat ratio by proper selection of the gas. Control of the last two parameters can be investigated as a possible means of protecting glass spheres against sympathetic implosion in multiple sphere buoyancy systems. (Author)

AD-641 123 **Field 20D, 20I**
CFSTI Prices: HC$4.00 MF$1.00
Boeing Scientific Research Labs., Seattle, Wash. Flight Sciences Lab.
HYDRODYNAMIC STABILITY OF VISCOUS FLOWS.
by F. D. Hains. Apr 66, 132p D1-82-027, Flight Sciences Lab-105

Descriptors: (*Gas flow, Stability), (*Magnetohydrodynamics, Stability), Boundary layer, Fluid dynamic properties, Viscosity, Numerical methods and procedures, Turbulence, Couette flow.

The Orr-Sommerfeld equation, which governs the stability of parallel flows, was solved by a numerical technique. Neutral stability curves were obtained for three different problems. The first problem is concerned with the effect of a flexible wall on the stability of the boundary layer on a flat plate. The second problem is concerned with the stability of magnetohydrodynamic channel flow with an aligned magnetic field. The last problem deals with the stability of Couette-Poiseuille flow. (Author)

D-641 124 **Field 20D, 20M**
CFSTI Prices: HC$2.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
PROPAGATION OF SPHERICAL SHOCK WAVES IN RADIATING DYNAMICAL SYSTEMS,
by Zdenek Kopal. Aug 66, 37p DI-82-0555, Mathematical note-475

Descriptors: (*Shock waves, Propagation), Gases, Transport properties, Energy, Momentum, Mathematical analysis.

A mathematical treatment is presented of spherical blast waves in a radiating gaseous medium. Radiation as well as gas is considered to contribute to the energy and momentum transfer; and their interaction is taken into account on the basis of the form of the energy-stress tensor which is exact as long as the squares and higher powers of a ratio of the velocity of gas to that of light can be ignored. (Author)

AD-641 137 Field 20D
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
DRAG AND STABILITY DATA OBTAINED FROM FREE-FLIGHT HYPERSONIC FIRINGS OF BOTH SHARP AND BLUNT NOSED 12-DEGREE 40-MINUTE TOTAL-ANGLE CONES AT SEVERAL RANGE PRESSURES,
by Leonard E. Crogan. 11 Jul 66, 22p NOLTR-63-36, Ballistics Research-94

Descriptors: (*Conical bodies, Hypersonic characteristics), Free flight trajectories, Drag, Stability, Blunt bodies, Reynolds number.

Drag and stability data obtained from hypersonic firings of both pointed and blunt nosed 12-degree 40-minute total-angle cones at several range pressures are tabulated. The drag coefficient of both cones decreased with an increase in the Reynolds number. No effect of Reynolds number on the center of pressure of either cone configuration was observed. (Author)

AD-641 139 Field 20D, 4B
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
LIQUID IMPACT SIMULATOR,
by Mark P. Scher. 17 Jun 66, 36p NOLTR-65-181
Proj. RM24-00010/212-1F008-08-01

Descriptors: (*Liquid jets, Simulators), (*Raindrops, *Simulators), Impact shock, Fracture (Mechanics), Penetration, Cavitation, Flight, Projectiles, Loading (Mechanics).

The liquid impact simulator is capable of shooting single jets of water of diameters varying from .020 inch to .100 inch at speeds up to 3000 feet per second. Minor adaptations of the apparatus could produce even higher velocity jets. These liquid jets are capable of pitting metal blocks, puncturing thin sheet metal, or cracking crystals. By varying the target position, the impulse loading rate can be altered. Photographs of jet behavior can be easily obtained. The speeds and masses of the water jets are comparable to those encountered in projectile flights through rain. However, jet diameters are smaller than those of raindrops with corresponding masses. Hence it is likely that longer and higher pressures are applied by the simulator jets. More knowledge of the mechanism of rain impact is necessary for a more accurate simulation. (Author)

AD-641 176 Field 20D
CFSTI Prices: HC$3.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
THE WATER ENTRY PROBLEM WITH BIBLIOGRAPHY,
by Wallace E. Parr. 31 Aug 66, 55p NOLTR-66-173, Mathematics dept-M-65

Descriptors: (*Water entry, *Mathematical models), (*Bibliographies, Water entry), Hydrodynamics.

The report is a survey of the water entry problem and its various mathematical formulations. Included are discussions on the incompressible case, the compressible case, the linearized incompressible, the linearized compressible, reflected linearized incompressible, Lagrangian, two-dimensional and axially-symmetric cases. Also discussed are the source and dipole formulations, calculation of added masses, similar solutions, problems related to water entry, and a note of caution concerning the conservation of mass in an infinite region. Finally, a fairly extensive bibliography is given primarily covering theoretical work on the water entry and related problems. (Author)

AD-641 202 Field 20D, 20K
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Fluid Dynamics Research Lab.
MACHINE COMPUTATION OF AERODYNAMIC LOADS IN LINEAR AND NONLINEAR SITUATIONS,
by Holt Ashley. Jul 66, 32p Rept. no. 66-5
Contract AF 49 (638)-1622
Proj. AF-9781
Task 978102
AFOSR-66-1440

Descriptors: (*Aerodynamic loading, Numerical analysis), Pressure, Distribution, Differential equations, Linear systems, Nonlinear systems, Wings, Boundary layer, Trailing edge, Supersonic flight.

The paper reviews recent successful efforts to determine the near field, i.e., to find the pressure distribution experienced by such surfaces. These involve a complete linearization of the governing differential equations and boundary conditions. With the object of escaping from the linear constraint -- often a very restrictive one -- recipes are given for higher-order calculations in two important situations. For inviscid, constant-density fluid flow, where the differential equation is linear, source and vortex methods have already been published whereby certain cases with nonlinear boundary conditions can be effectively analyzed. A new procedure is described which will permit the analysis of general three-dimensional wings, with circulation and a specified trailing-edge flow-off condition, by means of potential doublet sheets. It constructs the flow by computing transient fluid response from an undisturbed initial condition and is therefore specially adapted to unsteady-flow problems. The second case discussed involves certain second-order effects on loading in rectilinear supersonic flight, again allowing for unsteady effects of simple harmonic motion. It is shown how the linear solution for a source sheet can be modified to account for coupling with the steady flow due to thickness. Velocity potential sources are distributed over many small rectangular area elements and their loading contributions superimposed in the manner of 'aerodynamic influence coefficients.' (Author)

AD-641 225 Field 20D, 20I
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Physics.
ON THE EQUIVALENCE OF VORTICES AND CURRENT FILAMENTS,
by R. J. Donnelly, and A. L. Fetter. 20 Dec 65, 4p
Contract AF 49 (638)-1389, Grant AF-AFOSR-785-65
Proj. AF-9767
Task 976701
AFOSR-661584
Prepared in cooperation with Stanford Univ., Calif.
Availability: Published in The Physics of Fluids v9 n3 p619-20 Mar 1966.

Descriptors: (*Vortices, Theory), Helium, Liquefied gases, Electromagnetic waves, Electric currents, Magnetohydrodynamics.

The analogy between vortices and current filaments is discussed for the case of vortices in a rotating container. It is shown that care must be taken to avoid errors in applying the analogy in certain situations. (Author)

AD-641 227 Field 20D
Not available from CFSTI.
Chicago Univ., Ill.
GROWTH OF PINNED QUANTIZED VORTEX LINES IN HELIUM II,
by W. I. Glaberson, and R. J. Donnelly. 26 Jul 65, 6p
Grant AF-AFOSR-785-65
Proj. AF-9767
Task 976701
AFOSR-66-1447
Availability: Published in The Physical Review v141 n1 p208-10 Jan 1966.

Descriptors: (*Helium, Superfluidity), (*Superfluidity, *Vortices), Mathematical models, Liquefied gases, Cryogenics, Pipes.

A model is proposed for the onset of instability of superflow in a narrow tube assuming growth of a primordial vortex pinned to irregularities on the wall. A description of subcritical and supercritical flow is obtained closely paralleling that proposed by Donnelly on a phase-slip argument. The critical velocity corresponds to the minimum radius of curvature of the pinned vortex line. The operation of a quantized-vortex ring mill is described. (Author)

AD-641 238 Field 20D
Not available from CFSTI.
Rice Univ., Houston, Tex.
THREE-DIMENSIONAL CONFIGURATIONS OF MINIMUM TOTAL DRAG IN NEWTONIAN FLOW,
by David G. Hull. 1965, 8p
Grant AF-AFOSR-828-65
Proj. AF-9749
Task 974901
AFOSR-66-0050
Availability: Published in The Journal of the Astronautical Sciences v12 n3 p83-7 1965.

Descriptors: (*Airfoils, *Drag), Wings, Wing-body configurations, Angle of attack, Optimization, Partial differential equations.

Identifiers: Newtonian flow.

Variational problems associated with three-dimensional configurations (wings, bodies, and wing-body combinations) are considered, and the minimum drag problem is solved under the assumption that the base area and the wetted area are given while the length and the volume are free. The following hypotheses are employed: the configuration has two planes of symmetry; the angle of attack and the sideslip angle are zero; the pressure distribution is that pertaining to Newtonian flow; and the friction coefficient is constant. It is shown that the optimum configuration is governed by a first order, nonlinear, partial differential equation, and its general solution is presented in parametric form. Furthermore, the aerodynamic drag depends on the base area and the wetted area but is independent of the base shape; therefore, the optimum configuration is not unique. As a particular case, homothetic configurations are considered, (that is, configurations whose transversal contours are geometrically similar to the contour of the base), and the associated optimum geometries are determined. (Author)

AD-641 249 Field 20D
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Aerophysics Lab.
NONEQUILIBRIUM SHOCK EXPANSION METHOD AS A SIMPLE WAVE PERTURBATION.
Final technical rept.,
by W. C. L. Shih. Jul 66, 68p TR-123
Contract NOw-65-0105

Descriptors: (*Supersonic flow, Nonequilibrium flow), Shock waves, Theory, Perturbation theory, Vibration, Diatomic molecules, Wedges, Airfoils, Thermodynamics.

Shock expansion theory is useful for evaluating pressure distributions, flow field properties and shock shapes on airfoils and bodies with attached shock waves in supersonic perfect gas flows. This method is much simpler than the method of characteristics and yet gives accurate results which cannot be duplicated by purely linear theories. The nonequilibrium flow of a vibrating diatomic gas is treated as a perturbation of the perfect gas shock expansion flow field. The perturbation parameter is taken to be the ratio of a reference vibrational energy to (gamma-1) times the total enthalpy. Solutions in terms of quadratures are obtained for the effects of vibrational nonequilibrium on wedge flow, Prandtl-Meyer flow and the flow about a curved airfoil. The integrals in the wedge flow case

may be carried out analytically and the existence of an entropy layer on the body and a relaxation layer near the shock is deduced. (Author)

AD-641 254 **Field 20D**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Fluid Dynamics Research Lab.
THE IMPULSIVELY STARTED ELLIPTIC CYLINDER -- ORIGIN OF LIFT.
Interim rept.,
by Chang-Yi Wang. Jul 66, 108p Rept. no. 66-4
Contract AF 49 (638)-1622
Proj. AF-9781
Task 978102
AFOSR-66-1543

Descriptors: (*Cylindrical bodies, *Lift), Gas flow, Asymptotic series, Momentum, Transport properties, Stalling, Boundary layer.

A theoretical investigation was made of the subsequent transient motion of the flow field due to an impulsively started elliptic cylinder in an infinite fluid. The fluid is assumed to be slightly viscous such that the Reynolds number is large. The Navier-Stokes equations then pose a singular perturbation problem. The behavior at small times is investigated through the method of matched asymptotic expansions. The non-linear transport of momentum from the boundary layer and the induced flow is responsible for the pressure lift. Preliminary results show that the lift behaves as t to the 3/2 power. The phenomenon of stall is also discussed. The flow field induced by an impulsively started circular cylinder is investigated in detail. The induced exterior flow by the boundary layer behaves like a doublet whose strength increases as t to the 1/2 power. The apparent radius of the cylinder increases as more fluid is retarded. The asymmetric part is like a quadrapole increasing as t to the 3/2, which gives a pair of growing eddies behind the cylinder. The results are confirmed by qualitative experiments and existing photographs of the starting process. (Author)

AD-641 256 **Field 20D, 7D**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Gas Turbine Lab.
CONDENSATION OF SUPERSATURATED AMMONIA AND WATER VAPOR IN SUPERSONIC NOZZLES.
Rept. for Jan-Sep 66,
by Harry L. Jaeger. Sep 66, 120p Rept. no. 86
Contract Nonr-3963 (07)

Descriptors: (*Supersonic nozzles, Nucleation), (*Ammonia, Condensation), (*Water vapor, Condensation), Pressure.

An experimental investigation of condensation of ammonia and water vapor in supersonic nozzles is presented. Static-pressure data for both substances were obtained on the same apparatus using dried compressed air as the carrier gas. The effect of carrier-air moisture on the results for ammonia was also studied. A comparison between the data and predictions using existing nucleation and drop-growth theories indicated that neither the classical nor revised, so-called gasification, theories were generally applicable. The former agreed with the water data while the latter was in agreement with the data for ammonia. (Author)

AD-641 264 **Field 20D**
Not available from CFSTI.
Dartmouth Coll., Hanover, N. H.
PRESSURE GRADIENTS IN SUPERFLUID CAPILLARY FLOW,
by J. N. Kidder, and T. K. Chu. 1966, 2p
Grant AF-AFOSR-74-63
Proj. A-9767
Task 976701
AFOSR-66-1639
Document quoted below in its entirety.
Availability: Published in American Physical Society Meeting, Washington, D. C., 25-28 April 1966.

Descriptors: (*Helium, Fluid flow), (*Superfluidity, Pressure), Liquefied gases, Capillary tubes, Orifices, Stainless steel, Glass, Vortices, Drag.

We have been studying the flow of liquid helium through sub-millimeter capillaries at 0.4K. Gravitational flow under isothermal conditions has been induced by mechanical level displacement. Several forms of capillary have been used: Straight and spirallel stainless steel, and straight glass. The diameters are about .25 mm and the lengths 10 to 30 cm. The pressure gradients observed vary with fluid velocity v sub s as (v sub s-v sub c) to the x power, where v sub c is a critical velocity for superfluidity and the exponent x varies between 1.7 and 1.9. The measured critical velocities are about 0.5 cm/sec which is in good agreement with other experiments and techniques. End effects in the form of a pressure drop at the inlet and outlet have been investigated by using tapered ends, observing flow through several lengths in series, and by observing flow through a thin orifice. For a given fluid velocity, the pressure gradients observed with spirallel and straight stainless steel capillaries are greater than with straight glass. This is attributed to radial acceleration effects and to irregular cross sections. The apparent relative contribution to the pressure gradient of vortex drag along the capillary wall and vortex generation at the ends will be discussed. (Author)

AD-641 265 **Field 20D**
Not available from CFSTI.
Polytechnic Inst. of Brooklyn, Farmingdale, N. Y.
STUDIES ON THREE-DIMENSIONAL VISCOUS JETS.
Revised ed.,
by P. M. Sforza, M. H. Steiger, and N. Trentacoste. 3 Feb 66, 9p
Grant AF-AFOSR-1-63
Proj. AF-9781
Task 978101
AFOSR-66-1393
Presented at the AIAA Aerospace Sciences Meeting, (2nd) New York, Jan 25-27 1965 as Preprint 65-49.
Availability: Published in AIAA Journal v4 n5 p800-6 May 1966.

Descriptors: (*Jet mixing flow, Flow fields), Three-dimensional flow, Orifices, Turbulence, Axially symmetric flow, Incompressible flow.

An experimental and theoretical investigation of the bulk properties of turbulent, three-dimensional, incompressible, air jets issuing into a quiescent air ambient is presented. The jet orifices utilized included rectangular, elliptical, axisymmetric, and triangular geometries. Experimental results of pertinent mean flow properties such as axis velocity decay, half-width growth, etc., are reported. The flow fields of such jets are found to be characterized by three distinct regions in the axis velocity decay. An approximate theoretical analysis is shown to provide soutions that are in reasonable agreement with the experiment. The results obtained lead to the conclusion that low-speed jets that originate from nonaxisymmetric orifices decay to axisymmetry far downstream of the jet exit. (Author)

K-1665 **Field 20D**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge Gaseous Diffusion Plant, Tenn.
STUDY OF THE PERIPHERAL COMPRESSOR,
by Phillip Stephen Cates. 26 Aug 66, 163p
Contract W-7405-eng-26

Descriptors: (*Compressors, Performance (Engineering)), (*Gas flow, Centrifugal compressors).

For abstract, see NSA 20 21.

N66-30174 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
Catholic Univ. Of America, Washington, D. C.
TAYLOR INSTABILITY IN A STRATIFIED FLOW.
by T. J. Eisler. Feb 66, 25p NASA-CR-76101
Grant NSG-586
Its Rept.-66-002

Descriptors: *Eigenvalue, *Jet flow, *Taylor instability, Density, Equation, Flow, Instability, Jet, Linear, Mean, Number, Perturbation, Problem, Profile, Shear, Stratification, Velocity, Wave, Wave number.

For abstract, see STAR 04 17.

N66-30316 **Field 20D**
CFSTI Prices HC$2.00 MF$0.50
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
FLOW VISUALIZATION EXPERIMENTS WITH SEPARATED SUPERSONIC TURBULENT FLOW.
by M. V. Lowson. Apr 66, 48p NASA-CR-76126, WR-66-23
Contract NAS8-11308

Descriptors: *Flared body, *Flow visualization, *Shadowgraph, *Supersonic flow, *Turbulent flow, Body, Cylinder, Flare, Flow, Geometry, Mechanism, Model, Separation, Supersonic Surface, Test, Tunnel, Turbulent, Visualization, Wind.

For abstract, see STAR 04 17.

N66-31136 **Field 20D**
CFSTI Prices HC$2.00 MF$0.50
Compagnie De Recherches Et D Etudes Aeronautiques, Paris (France).
CONTROL OF CIRCULATION AROUND A CIRCULAR CYLINDER.
by J. Brocard. 20 Jan 64, 38p AD-631754
Contract AF 61/052/-653

Descriptors: *Blowing, *Circular cylinder, *Lift-drag ratio, *Suction, Air, Circular, Current, Cylinder, Drag, Jet, Lift, Ratio, Surface, Tunnel, Wind.

For abstract, see STAR 04 17.

N66-31352 **Field 20D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
CAVITATION SIMILARITY CONSIDERATIONS BASED ON MEASURED PRESSURE AND TEMPERATURE DEPRESSIONS IN CAVITATED REGIONS OF FREON 114.
by T. F. Gelder, R. D. Moore, and R. S. Ruggeri. Jul 66, 37p NASA-TN-D-3509

Descriptors: *Cavitation, *Freon, *Pressure measurement, *Temperature measurement, *Venturi tube, Bulk, Depression, Ethylene, Flow, Free, Glycol, Hydrodynamics, Liquid, Measurement, Nitrogen, Pressure, Stream, Temperature, Tunnel, Vapor, Velocity, Water.

For abstract, see STAR 04 17.

N66-31965 **Field 20D**
CFSTI Prices HC$3.25 MF$1.00
Technische Hochschule Carolo Wilhelmina, Brunswick (West Germany). Fakultaet Fuer Maschinenwesen.
CRITICAL COMPARISON OF SEVERAL METHODS FOR MEASURING MACH-NUMBER DURING FLIGHT OF ROCKET-VEHICLES.
Kritischer Vergleich Einiger Machzahl-Messmethoden Fuer Den Freiflug Von Fernraketen
by G. H. Reisig. 1964, 154p
In German

Descriptors: *Mach number, *Measure theory, *Rocket flight, *Velocity measurement, Accuracy, Acoustics, Analysis, Comparison, Data, Evaluation, Flight, Mathematics, Measurement, Pressure, Rocket, Temperature, Vehicle, Velocity.

For abstract, see STAR 04 17.

N66-32107 Field 20D
CFSTI Prices HC$1.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
AN EXPERIMENTAL STUDY OF LIQUID SURFACE OSCILLATIONS IN LONGITUDINALLY EXCITED COMPARTMENTED CYLINDRICAL AND SPHERICAL TANKS.
by D. D. Kana. Aug 66, 26p NASA-CR-545
Contract NAS8-11045

Descriptors: *Cylindrical tank, *Fluid mechanics, *Liquid surface, *Oscillation, *Spherical tank, Cylinder, Dynamics, Excitation, Fluid, Hydrodynamics, Liquid, Longitudinal, Mechanics, Model, Propellant, Spherical, Surface, Tank, Vibration.

For abstract, see STAR 04 17.

N66-32190 Field 20D
CFSTI Prices HC$2.50 MF$0.75
Mcgill Univ., Montreal (Quebec). Space Research Inst.
A FINITE DIFFERENCE SOLUTION FOR THE TWO- DIMENSIONAL EXPANSION OF A FINITE CYLINDRICAL GAS CLOUD INTO A VACUUM.
by G. G. Bach, and J. H. Lee. Apr 66, 66p
NASA-CR-54726, SRI-I-TN-3
Contract NAS3-4190

Descriptors: *Gas expansion, *Rarefaction wave, *Wave interaction, Axial, Cloud, Coordinate, Cylinder, Difference, Dynamics, Equation, Expansion, Finite, Flow, Gas, Integration, Interaction, Model, Numerical, Physical, Radial, Rarefaction, Shape, System, Vacuum, Wave.

For abstract, see STAR 04 17.

N66-32442 Field 20D
CFSTI Prices HC$1.00 MF$0.50
Ling-temco-vought, Inc., Dallas, Tex. Research Center.
STUDY OF VORTEX BOUNDARY LAYER INTERACTIONS FINAL REPORT, PERIOD ENDING 26 JUN. 1966.
by J. G. Spangler. 1966, 20p NASA-CR-76772
Contract NASW-956

Descriptors: *Pipeflow, *Turbulent boundary layer, *Vortex, Boundary, Drag, Flat, Friction, Intensity, Interaction, Layer, Measurement, Plate, Pressure, Profile, Skin, Speed, Turbulent, Very low.

For abstract, see STAR 04 17.

N66-32552 Field 20D
CFSTI Prices HC$3.00 MF$0.75
Case Inst. Of Tech., Cleveland, Ohio. Engineering Div.
THE KELVIN- HELMHOLTZ INSTABILITY WITH ARBITRARILY ORIENTED BODY FORCE.
by R. G. Hantman, and S. Ostrach. Jun 66, 102p
NASA-CR-76798, FTAS/TR-66-11
Grant NSG-391

Descriptors: *Interface stability, *Inviscid flow, *Liquid-gas mixture, *Reentry body, Ablation, Body, Density, Flow, Fluid, Force, Gas, Interface, Inviscid, Liquid, Mixture, Molten, Parallel, Ratio, Reentry, Stability, Stream, Superposition, Tangent, Two.

For abstract, see STAR 04 17.

N66-32615 Field 20D
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECTS OF TWO VIBRATION-DISSOCIATION COUPLING MODELS ON NONEQUILIBRIUM HYPERSONIC FLOW OF NITROGEN OVER A WEDGE.
by F. R. De jarnette. Aug 66, 31p NASA-TN-D-3521

Descriptors: *Hypersonic speed, *Mathematical model, *Vibration effect, *Wedge flow, Coupling, Dissociation, Effect, Field, Flow, Hypersonic, Mathematics, Model, Nitrogen, Nonequilibrium, Past, Shock, Speed, Vibration, Wave, Wedge.

For abstract, see STAR 04 17.

N66-32644 Field 20D
CFSTI Prices HC$2.50 MF$0.75
General Applied Science Labs., Inc., Westbury, N. Y.
FINITE RATE EVAPORATION OF CRYOGENIC HYDROGEN IN TWO-PHASE AIR TECHNICAL REPORT NO. 367.
by R. Edelman, and H. Rosenbaum. Sep 63, 74p
NASA-CR-76978
Contract NAS8-2686

Descriptors: *Cryogenic fluid, *Evaporation rate, *Liquid hydrogen, *Two-phase flow, Condensation, Cryogenic, Evaporation, Finite, Flow, Fluid, Fraction, Gas, Hydrogen, Inviscid, Liquid, Mass, Particle, Phase, Rate, Two.

For abstract, see STAR 04 17.

N66-32680 Field 20D
CFSTI Prices HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex. Dept. Of Mechanical Sciences.
MOMENT OF INERTIA AND DAMPING OF LIQUIDS IN BAFFLED CYLINDRICAL TNKS TECHNICAL REPORT NO. 11.
by F. T. Dodge, and D. D. Kana. 4 Jun 65, 33p
NASA-CR-76915
Contract NAS8-1555

Descriptors: *Cylindrical tank, *Damping, *Liquid sloshing, *Moment, Approximation, Baffle, Computation, Container, Cylinder, Inertia, Liquid, Model, Sloshing, Small, Tank.

For abstract, see STAR 04 17.

N66-36847 Field 20D
CFSTI Prices HC$2.50 MF$0.75
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
AN ANALYTICAL STUDY OF SEPARATED FLOWS INDUCED BY SHOCK WAVE - BOUNDARY LAYER INTERACTION.
by M. S. Holden. Oct 66, 70p NASA-CR-600
Contract NAS5-3976

Descriptors: *Boundary layer, *Separated flow, *Shock wave interaction, Boundary, Equation, Flow, Hypersonic, Interaction, Inviscid, Laminar, Layer, Separation, Shock, Supersonic, Velocity, Wall, Wave, Wedge.

For abstract, see STAR 04 22.

N66-36852 Field 20D
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
TRANSFER FUNCTION ANALYSIS OF A FLUID CONTAINED IN A LONGITUDINALLY EXCITED THIN-WALL CYLINDRICAL TANK.
by C. F. Lorenzo. Sep 66, 24p NASA-TN-D-3636

Descriptors: *Cylindrical tank, *Fluid, *Longitudinal wave, *Thin wall, *Transfer function, Analysis, Boundary, Condition, Cylinder, Equation, Frequency, Function, Longitudinal, Resonance, Tank, Transfer, Wave.

For abstract, see STAR 04 22.

N66-36859 Field 20D
CFSTI Prices HC$3.25 MF$1.00
General Applied Science Labs., Inc., Westbury, N. Y.
NUMERICAL FLOW FIELD PREDICTION FOR PROJECT RAM-C.
by J. Jannone, B. Kaplan, and G. Widhopf. 30 Jun 66, 170p NASA-CR-66109, GASL-TR-05
Contract NAS1-5519

Descriptors: *Flow field, *Radio attenuation measurement (ram) project, *Shock layer, Boundary, Chemistry, Field, Flow, Inviscid, Iteration, Launch vehicle, Layer, Prediction, Reentry, Shock, Solution, Vehicle, Viscous.

For abstract, see STAR 04 22.

N66-36935 Field 20D
CFSTI Prices HC$1.00 MF$0.50
Martin Co., Denver, Colo.
LIQUID SETTLING IN LARGE TANKS.
by T. E. Bowman. 1965, 20p NASA-CR-78064, AD-633766
Contract NAS8-11328
Presented At Symp. On Fluid Mech. And Heat Transfer Under Low Gravitational Conditions, Palo Alto, Calif., 24-25 Jun. 1965

Descriptors: *Liquid flow, *Liquid gas, *Propellant tank, Bond, Flat, Flow, Fluid, Gas, Instability, Interface, Liquid, Number, Orbital, Propellant, Settling, Surface, Tank, Tension, Vapor.

For abstract, see STAR 04 22.

N66-37033 Field 20D
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
VELOCITY PROFILES AND EDDY VISCOSITY DISTRIBUTIONS DOWNSTREAM OF A MACH 2.22 NOZZLE EXHAUSTING TO QUIESCENT AIR.
by J. M. Eggers. Sep 66, 93p NASA-TN-D-3601

Descriptors: *Exhaust nozzle, *Turbulent mixing, *Velocity profile, *Viscosity, Air, Axisymmetry, Compressible, Distribution, Downstream, Eddy, Equation, Exhaust, Function, Mixing, Momentum, Nozzle, Pressure, Profile, Quiescence, Survey, Turbulence, Velocity.

For abstract, see STAR 04 22.

N66-37150 Field 20D
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
STABILITY OF INTERMIXING OF HIGH-VELOCITY VAPOR WITH ITS SUBCOOLED LIQUID COCURRENT STREAMS.
by W. F. Brown, and W. H. Westendorf. Oct 66, 25p NASA-TN-D-3553

Descriptors: *Condenser, *Flow stability, *Mixed flow, Flow, High velocity, Internal, Liquid, Mixture, Narrow, Pressure, Stability, Streamline, Subcooling, Tube, Turbulence, Vapor.

For abstract, see STAR 04 22.

N66-37292 Field 20D
CFSTI Prices HC$1.00 MF$0.50
Catholic Univ. Of America, Washington, D. C.
TAYLOR INSTABILITY IN A STRATIFIED FLOW.
by T. J. Eisler. Oct 66, 22p NASA-CR-569
Grant NSG-586

Descriptors: *Stratified flow, *Taylor instability, Density, Discontinuity, Eigenvalue, Equation, Flow, Instability, Jet, Linear, Number, Perturbation, Profile, Shear, Stability, Static, Stratification, Velocity, Wave.

For abstract, see STAR 04 22.

N66-37320 **Field 20D**
CFSTI Prices HC$2.00 MF$0.50
Polytechnic Inst. Of Brooklyn, N. Y.
ELECTRONIC EFFECTS IN EXPANSIVE FLOW UNDER HYPERSONIC CONDITIONS.
by M. H. Bloom. 1966, 28p NASA-CR-78199
Grant NSG-409

Descriptors: *Electric property, *Hypersonic flow, *Plasma flow, *Shock tunnel, Air, Cavity, Current, Density, Distribution, Effect, Electron, Heat, Ion, Measurement, Microwave, Nozzle, Plasma, Probe, Resonance, Temperature, Transfer.

For abstract, see STAR 04 22.

N66-37414 **Field 20D**
CFSTI Prices HC$3.00 MF$1.00
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TABLES OF MACH NUMBER FROM 0 TO 100 FOR COMPRESSIBLE GASES WITH SPECIFIC HEAT RATIOS FROM 1.66 THROUGH 1.10.
by D. Dembrow. Jun 66, 141p NASA-TM-X-55567, X-470-66-269

Descriptors: *Compressible fluid, *Mach number, *Specific heat, *Table, Chamber, Compressible, Exhaust, Fluid, Fluorine, Heat, Hydrogen, Propellant, Ratio, Rocket, Specific, Thrust.

For abstract, see STAR 04 22.

N66-37565 **Field 20D**
CFSTI Prices HC$5.00 MF$1.25
Mississippi State Univ., State College. Engineering And Industrial Research Station.
RESEARCH STUDY FOR DETERMINATION OF LIQUID SURFACE PROFILE IN A CRYOGENIC TANK DURING GAS INJECTION ANNUAL REPORT NO. 2, JUN. 18, 1965 - JUN. 17, 1966.
by E. H. Bishop, W. S. Cagle, R. E. Forbes, W. D. Mc cain Jr, and J. T. Smith. 17 Jun 66, 177p NASA-CR-78362
Contract NAS8-11334

Descriptors: *Cryogenic fluid, *Gas injection, *Liquid surface, Bubble, Entrainment, Flow, Gas, Liquid, Profile, Propellant, Rocket, Stream, Surface, System, Theory.

For abstract, see STAR 04 22.

N66-37575 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
Army Missile Command, Huntsville, Ala.
SOME PECULIARITIES IN THE DESIGN OF A NONEQUILIBRIUM TWO-STEP NOZZLE.
by V. A. Bashkatov, and A. A. Tsvetkova. 10 May 66, 16p NASA-CR-78390, RSIC-545
Contract NAS5-9299
Transl. Into English From Izv. Sibirskogo Otd. Akad. Nauk Sssr (Novosibirsk), V.6, No. 2, 1955 P 88-93

Descriptors: *Gas flow, *Nozzle flow, *Rocket nozzle, Conductivity, Design, Dynamics, Gas, Nonequilibrium, Nozzle, Step, Thermal, Two, Velocity.

For abstract, seeSTAR 04 22.

PB-173 243 **Field 20D, 20M**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
THE OSCILLATORY BEHAVIOR OF HEATED CHANNELS - AN ANALYSIS OF THE DENSITY EFFECT. PART I: THE MECHANISM (NON-LINEAR ANALYSIS),
by Jean Boure. Sep 66, 40p CEA-R-3049

Descriptors: (*Fluids, *Oscillation), (*Density, Heating), Boilers, Boiling water reactors, Liquid rocket propellants, Thermodynamics, Nonlinear systems, France.

The problem of the oscillatory behavior of heated channels is presented in terms of delay-times and a density effect model is proposed to explain the behavior. The density effect is the consequence of the physical relationship between enthalpy and density of the fluid. Non-linear equations are derived from the model in a dimensionless form. A description of the mechanism of oscillations is given, based on the analysis of the equations. An inventory of the governing parameters is established. At this point of the study, some facts in agreement with the experiments can already be pointed out. (Author)

PB-173 244 **Field 20D, 20M**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
THE OSCILLATORY BEHAVIOR OF HEATED CHANNELS - AN ANALYSIS OF THE DENSITY EFFECT. PART II: THE OSCILLATIONS THRESHOLDS (LINEARIZED ANALYSIS,
by Jean Boure. Sep 66, 39p CEA-R-3049
See also PB-173 243

Descriptors: (*Fluids, *Oscillation), (*Density, Heating), Enthalpy, Equations, Linear systems, Frequency, France.

The onset of the oscillatory behavior of heated channels is studied in terms of the so-called 'density effect', consequence of the physical relationship between enthalpy and density of the fluid. The threshold equations are derived, after linearization of the equations obtained in Part I. They can be solved rigorously by numerical methods to yield: (1) a relation between the describing parameters at the onset of oscillations, and (2) the frequency of the oscillations. By comparing the results predicted by the model to the experimental behavior of actual systems, the density effect is very often shown to be the actual cause of oscillatory behaviors. (Author)

AD-640 726 **See Field 12A**

AD-640 816 **See Field 20I**

AD-640 872 **See Field 20M**

AD-641 230 **See Field 7D**

20E. MASERS AND LASERS

AD-468 433 **Field 20E, 20F**
CFSTI Price: HC$5.60
International Business Machines Corp., Poughkeepsie, N. Y. Development Lab.
USE OF OPTICAL MASERS IN DISPLAYS AND PRINTERS.
Final rept. no. 8, 24 Nov 64-23 May 65,
by W. Kulcke, K. Kosanke, E. Max, and H. Fleisher. 23 May 65, 57p
Contract DA-36-039-AMC-00118 (E)

Descriptors: (*Lasers, Army research), Input-output devices, Focusing, Display systems, Optical images, Switching circuits, Circuits, Design, Waveform generators, Refraction, Deflection.

The report describes the design and construction of the peripheral components required for a model of a two-dimensional digital electro-optic light deflector for 256 x 256 positions. The description of a unit for high-speed switching and modulation includes the effect of the signal of a high-speed electronic switching circuit on the light components transmitted through a KD*P crystal. An electro-optic modulator is used for strobing the light beam. Electronic circuits as well as their mechanical design are discussed. Also discussed in this report are: A beam widener for expanding the laser beam to the aperture of the deflector, the mechanical design of the deflecting system, mounting of the electro-optic and birefringent crystals, and the electrical circuit for push-button control of the deflector. A 60-cps square-wave generator is an optional power supply or control unit. An analysis of power dissipation discusses the problem connected with creased switching speeds.

AD-640 741 **Field 20E, 20F**
Not available from CFSTI.
Army Electronics Command, Fort Monmouth, N. J. Inst. for Exploratory Research.
LASER PUMPING BY INTENSE DISCHARGES IN z-PINCH GEOMETRY,
by Rudolf G. Buser, and Dietolf Ramm. 27 Sep 65, 5p
Availability: Published in Applied Optics v5 n4 p627-31 Ap966.

Descriptors: (*Lasers, Pumping (Optical)), Gas discharges, Optical properties, Performance (Engineering).

Optical properties of high-current, low-pressure, noble-gas discharges in z-pinch geometry are studied and compared with theta-pinch discharges and standard commercial light sources. Results indicate possible usefulness in systems where high peak power, high repetition rates or high uv content are demanded. (Author)

AD-640 759 **Field 20E**
Not available from CFSTI.
American Optical Co., Southbridge, Mass.
FREQUENCY CONTROL OF A Nd (3+) GLASS LASER.
by Elias Snitzer. 7 Jun 65, 5p
Contract DA-19-020-ORD-5575
AROD-3209:4
Availability: Published in Applied Optics v5 n1 p121-5 Jan 1966.

Descriptors: (*Lasers, Control systems), Neodymium, Glass, Reflectors, Frequency.

It is found that laser emission can be obtained in narrow lines less than 0.1A wide anywhere within a 130-A interval centered about the peak emission at 1.06 microns by the use of thin reflecting plates acting as wavelength-sensitive mode selectors. For a plate aligned perpendicular to the axis of the laser the emission is at those wavelengths at which the plate thickness is an odd number of quarter wavelengths. The plate tends to produce a spiking emission as a function of time and no loss in output energy. (Author)

AD-640 782 **Field 20E, 18H**
Not available from CFSTI.
Illinois Univ., Urbana. Dept. of Electrical Engineering.
FAST NEUTRON IRRADIATION-EFFECTS ON GaAs sub (1-x) Px P-N DIODE LASER THRESHOLD CURRENTS,
by J. H. Doede, R. H. Vonderohe, N. Holonyak, C. J. Nuese, and C. M. Wolfes. 14 Oct 64, 4p
Contract AF 49 (638)-417
Proj. AF-9763
Task 976302
AFOSR-66-1649
Availability: Published in Journal of Applied Mathematics and Physics v16 n1 p99-100 1965.

Descriptors: (*Lasers, *Radiation damage), (*Diodes (Semiconductor), Lasers), Fast neutrons, Impurities, Band theory of solids, Grain boundaries, Crystal lattice defects, Transport properties.

Two of the major problems associated with the construction of laser diodes from ternary system material are the chemical purity and the inhomogeneous polycrystalline nature of the final product. The presence of chemical impurities introduces deep levels in the band gap of the diode, giving rise to non-radiative transitions which compete with the radiative transitions in the recombination process. The polycrystalline structure introduces grain boundaries and crystalline faults into the junction area causing discontinuities in the junction and scattering light out of the cavity. Both effects increase the current density necessary for laser action. (Author)

N66-32437 **Field 20E**
CFSTI Prices HC$1.00 MF$0.50
Carnegie Inst. Of Tech., Pittsburgh, Pa.
A NOTE ON THE THERMODYNAMICS OF LASERS.
by R. L. Longini. 1964, 12p NASA-CR-76761
Contract NAS8-5269

Descriptors: *Chemical laser, *Cooling, *Thermodynamics, Chemical, Conversion, Critical, Efficiency, Energy, Environment, Heat, Injection, Laser, Light, Phonon, Photon, Removal, Temperature.

For abstract, see STAR 04 17.

N66-32684 **Field 20E**
CFSTI Prices HC$2.50 MF$0.75
Smithsonian Astrophysical Observatory, Cambridge, Mass.
SATELLITE TRACKING WITH A LASER.
by C. G. Lehr. 20 Jun 66, 66p NASA-CR-76902, SAO SPECIAL REPT.-215
Grant NSG-87-60

Descriptors: *Laser, *Radar system, *Satellite tracking, Comparison, Day, Detection, Energy, Equation, Gas, Glass, Light, Night, Photography, Radar, Range, Retroreflection, Ruby, Satellite, Semiconductor, System, Tracking, Transmitter.

For abstract, see STAR 04 17.

AD-640 540 **See Field 17H**

AD-641 185 **See Field 20L**

20F. OPTICS

AD-640 641 **Field 20F**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
FAR INFRARED STUDY OF THE COPPER HALIDES AT LOW TEMPERATURES.
Physical sciences research papers,
by J. N. Plendl, A. Hadni, J. Claudel, Y. Henninger, and G. Morlot. 17 Aug 65, 9p AFCRL-PSRP-249, AFCRL-66-511
Proj. AF-5621
Task 562105
Availability: Published in Applied Optics v5 n3 p397-401 Mar 1966.

Descriptors: (*Spectra (Infrared), Copper compounds), (*Copper compounds, Halides), Resonant frequency, Damping, Low-temperature research, Light transmission, Reflection.

The far infrared spectra of the copper halides CuCl, CuBr, and CuI have been measured in transmission and in reflection at various fixed temperatures from room temperature to liquid-helium temperature. Marked changes of such parameters as resonance frequency and damping as a function of temperature have been observed, also a line-splitting in the case of CuCl. In addition, a considerable increase in the asymmetry of the transmission curves with decreasing temperature has been observed. (Author)

AD-640 960 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
POLARIZATION PROPERTIES OF FAR INFRARED BEAMSPLITTERS.
Instrumentation papers,
by Ernest V. Loewenstein, and Amos Engelsrath. Aug 66, 14p AFCRL-66-536, AFCRL-IP-115
Proj. AF-7670
Task 767003
Presented at Colloque sur les Methodes Nouveaux de Spectroscopie, CNRS, Paris, April 25-28, 1966.

Descriptors: (*Interferometers, Polarization), (*Infrared filters, Polarization), Optical equipment components, Films, Measurement, Polarizing filters.

The energy throughput of an interferometer is calculated for the case where an unsupported thin film is used as a beamsplitter. The polarization of the beam toward the detector is calculated, and it is shown that by setting the beamsplitter at the Brewster angle rather than at the usual 45 degrees, a completely polarized output beam can be produced with very little loss of energy. The theoretical and experimental results are in good agreement. (Author)

AD-641 032 **Field 20F, 11G, 17E**
CFSTI Prices: HC$1.00 MF$0.50
Bausch and Lomb, Inc., Rochester, N. Y.
INFRARED COATING STUDIES.
Quarterly rept., no. 1, 16 Jun-15 Sep 66. 15 Sep 66, 6p
Contract DA-44-009-AMC-1707 (E)

Descriptors: (*Infrared filters, *Optical coatings), (*Infrared optical materials, Optical coatings), Films, Refractive index, Vapor plating, Cesium compounds, Iodides, Bromides, Silicon compounds, Oxides, Lead compounds, Imides, Polymers.

Identifiers: Reststrahlen, Cesium iodide, Cesium bromide, Silicon monoxide, Lead iodide, Polyimides.

The report contains the results of investigations into new materials to be used as low index spacer layers in the fabrication of the A reststrahlen transmission filter. These include KRS-5, CsI, CsBr, SiO, and PbI2. In addition, an evaluation of 'Kapton' polyimide film as a substrate material, is given for the 20 to 40 micron region.

AD-641 047 **Field 20F**
Not available from CFSTI.
University of Southern California, Los Angeles.
INFRARED COMBINATION MODE ABSORPTION IN LITHIUM-BORON-DOPED SILICON,
by W. G. Spitzer, M. Waldner, and M. A. Hiller. 10 May 65, 7p
Grant AF-AFOSR-496-65
Proj. AF-4751
AFOSR-66-0080
Prepared in cooperation with North American Aviation Science Center, Thousand Oaks, Calif.
Availability: Published in Physical Review v140 n1A p172-6 Oct 4 1965.

Descriptors: (*Silicon, Absorption spectrum), (*Spectra (Infrared), Silicon), Doping, Lithium, Boron.

Infrared absorption bands due to double-quantum transitions of local lattice-mode vibrations is boron-lithium-doped silicon were observed. The transitions are found near twice the frequency of all local modes and at the sum frequency of the two strongest local-mode vibrations, which are those associated with boron-lithium pairs. The relative strengths of the pair modes, the displacement of the modes from the mode due to isolated substitutional boron, and the relative strengths of the overtone absorption bands are consistent with the assumption of a predominantly Coulomb interaction between the boron and the lithium ions. Five additional absorption bands, with frequency depending upon boron isotope, are found at frequencies not corresponding to sums of local-mode frequencies. Four of these bands occur at sum frequencies of the two strongest local-mode frequencies. Four of these bands occur at sum frequencies of the two strongest local-mode frequencies and of silicon critical-point phonon frequencies. The dependence of the frequency of all absorption peaks on lithium and boron isotopes is used to assist in the assignment of the absorption bands. (Author)

AD-641 090 **Field 20F, 20J, 20C**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ., N. Y. Dept. of Physics and Astronomy.
STATISTICAL PROPERTIES OF ELECTROMAGNETIC RADIATION.
Progress rept. no. 1, 1 Aug 64-31 Mar 65,
by Emil Wolf. 31 Mar 65, 5p
Grant DA-ARO (D)-31-124-G569

Descriptors: (*Electromagnetic waves, *Quantum statistics), Optics, Correlation techniques.

The research during the period covered by the present report was mainly concerned with the following topics: (a) Quantum Optics; (b) Correlation Techniques in Optical Wave Fields; and (c) Structure of the Electromagnetic Field in the Focal Region of Coherent Light Beams.

AD-641 140 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
Redstone Scientific Information Center, Redstone Arsenal, Ala.
LIGHT REFLECTION FROM ROUGH SURFACES,
by V. K. Polyanskii, and V. P. Rvachev. Sep 66, 17p RSIC-588
TT-66-62525
Trans. of Optika i Spektroskopiya (USSR), v20 n4 p701-8 1966.

Descriptors: (*Dielectrics, *Reflection), Polarization, Light, Surfaces, Roughness, Scattering, Diffraction, Approximation (Mathematics), USSR.

The effect of the scattering of polarized light by a dull dielectric surface was studied. The zeroth diffraction approximation proves to be more detailed than does the ray-optics approximation. In such an approximation, we must repeatedly explain the fact of light depolarization and the dependence of polarization effects upon the scattering conditions and also the displacement of the maximum of the scattering curve for larger observation angles. (Author)

AD-641 224 **Field 20F, 20L, 7D**
Not available from CFSTI.
Yale Univ., New Haven, Conn.
SPECTROSCOPY IN THE 5 TO 400 WAVENUMBER REGION WITH THE GRUBB PARSONS INTERFEROMETRIC SPECTROMETER.
Interim rept.,
by R. G. Wheeler, and J. C. Hill. 4 Nov 65, 11p
Grant AF-AFOSR-873-65
Proj. AF-9763
Task 976302
AFOSR-66-1658
Availability: Published in Journal of the Optical Society of America v56 n5 p657-65 May 1966.

Descriptors: (*Infrared spectroscopy, Instrumentation), (*Spectrum analyzers, Design), (*Interferometers, Infrared spectroscopy), Cryogenics, Solid state physics, Integral transfrms, Infrared optical systems.

Identifiers: Grubb Parsons spectrometers.

A Grubb Parsons interferometric spectrometer was modified for low-temperature solid-state studies in the spectral region of 5 to 400 wavenum-

bers. The cryogenic, spectrographic, and computational techniques are considered in detail. (Author)

AD-641 275 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
THE ILLUMINATION OF SPECTROGRAPHS OF LENTICULAR SCREENS,
by Ekkehard Preuss. Aug 66, 23p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-1M624201D466
TT-66-62541, ERDL-T-1871-66
Die Ausleuchtung von Spektrographen mit Linsenrastern, trans. of Beitraege zur Mineralogie und Petrographie (West Germany), v4 p163-71 1954.

Descriptors: (*Lenses, Spectrum analyzers), Reliability, Illumination, Intensity, West Germany.

The image of the lightsource in quantitative spectral analysis is usually projected into the optical system with a lens in front of the slit. The intensity ratio in the spectrum may not be presented correctly if part of the image of the light source is lost in the set of prisms due to vignetting or by absorption and glare. Lenticular screens are used in a special illumination design. This way a multiple image of the light source will be produced and the optical system of the spectrograph will be illuminated uniformly and reproducibly. (Author)

N66-30116 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Trw Systems, Redondo Beach, Calif.
DEVELOPMENT AND FABRICATION OF ABLATIVE OPTICAL BEACONS FINAL REPORT, 4 DEC. 1965 - 30 APR. 1966.
by F. N. Mastrup, and R. Odenberg. 17 May 66, 47p NASA-CR-65413, TRW-5541-6001-R-000
Contract NAS9-5374

Descriptors: *Ablating material, *Apollo project, *Lamp, *Lifetime, *Radiation spectrum, *Reliability, Ablation, Beacon, Boiler, Flash, Material, Optical, Pulse, Quartz, Radiation, Spectrum, System, Trigger, Xenon.

For abstract, see STAR 04 17.

N66-30165 **Field 20F**
CFSTI Prices HC$4.00 MF$0.75
Itt Industrial Labs., Fort Wayne, Ind.
HIGH RESOLUTION NIGHTTIME CLOUD-COVER RADIOMETER QUARTERLY REPORT XVII, 1 OCT. 1965 - 1 JAN. 1966.
by P. Eagle, R. Harber, R. Miller, P. C. Murray, and P. R. Sargent. 27 Apr 66, 111p NASA-CR-76092, ITTIL-66-1024
Contract NAS5-668

Descriptors: *Cloud cover, *Infrared instrument, *Radiometer, Cloud, Component, Cover, Design, Electronic, High resolution, Infrared, Instrument, Instrumentation, Mechanical, Nimbus satellite, Optical, Packaging, Satellite, System.

For abstract, see STAR 04 17.

N66-30187 **Field 20F**
CFSTI Prices HC$4.00 MF$0.75
Trw Systems Group, Redondo Beach, Calif.
THEORETICAL INVESTIGATION - THE SCATTERING OF LIGHT BY A PLANETARY ATMOSPHERE FINAL REPORT, 15 SEP. 1965 - 21 JUN. 1966.
by R. S. Fraser. 1966, 119p NASA-CR-76122, TRW-4520-6003-R-000
Contract NAS5-9678

Descriptors: *Light scattering, *Planetary atmosphere, *Rayleigh distribution, *Specular reflection, Albedo, Atmosphere, Calculation, Computer, Ground, Light, Planetary, Polarization, Reflection, Scattering, Specular.

For abstract, see STAR 04 17.

N66-30328 **Field 20F**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE SPECTRAL DISTRIBUTION AND UNIFORMITY OF THE CARBON ARC.
by S. Alexander. Mar 66, 54p NASA-TM-X-55505, X-713-66-79

Descriptors: *Carbon arc, *Spectral energy distribution, Arc, Carbon, Distribution, Energy, Radiation, Simulation, Solar, Spectral, Spectrum, Stability, Temperature, Uniform.

For abstract, see STAR 04 17.

N66-31705 **Field 20F**
CFSTI Prices HC$3.25 MF$1.25
Carnegie Inst. Of Tech., Pittsburgh, Pa. Dept. Of Electrical Engineering.
OPTICS OF A BIREFRINGENT PLATE WITH APPLICATIONS TO ELLIPSOMETRY.
by D. A. Holmes. 1965, 195p NASA-CR-76443
Contract NAS8-5269

Descriptors: *Gallium arsenide, *Optical property, *Single crystal, *Stress, Absorption, Anisotropy, Birefringence, Electromagnetic, Ellipsometer, Infrared, Laser, Maxwell equation, Reflection, Strain, Wave.

For abstract, see STAR 04 17.

N66-31772 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratori Nazionali Di Frascati.
STUDY OF THE OPTICAL PROPERTIES OF A HIGH-POWERED MAGNET (SACERDOTI-TAU TYPE).
Studio Delle Proprieta' Ottiche Di Un Magnete A Focheggiamento Forte (Tipo Sacerdoti-tau)
by B. Borgia, M. Grilli, and P. Voos. 21 Mar 66, 46p LNF-66/15
In Italian Its Nota Interna No. 314

Descriptors: *Magnet, *Magnetic property, *Optical property, Alpha, Approximation, Calculation, Coordinate, Current, Curve, Dispersion, Focus, Induction, Linear, Magnetic, Magnetization, Measurement, Moment, Optical, Power, Property, Resolution, Trajectory, Wire.

For abstract, see STAR 04 17.

N66-32119 **Field 20F**
CFSTI Prices HC$8.23 MF$3.50
Macneal-schwendler Corp., San Marino, Calif.
ANALYSIS OF THERMAL TEST ERRORS RESULTING FROM IMPERFECTLY COLLIMATED SOLAR SIMULATION BEAMS- APPENDIX A - RELATIVE ENERGY FLUX DENSITY AND RELATIVE ENERGY IN PENUMBRAE OF VARIOUS SHADOWING OBJECTS.
by E. J. Gooze. Jun 66, 773p NASA-CR-76463
Contracts NAS7-100, JPL-951330
Prepared For Jpl

Descriptors: *Energy transfer, *Flux density, *Shadow, *Solar simulation, Analysis, Beam, Collimation, Density, Energy, Error, Flux, Penumbra, Relative, Simulation, Solar, Test, Thermal.

For abstract, see STAR 04 17.

N66-37323 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
California Univ., Riverside. Dept. Of Physics.
A MODIFIED OPTICAL POTENTIAL APPROACH TO LOW-ENERGY ELECTRON-HELIUM SCATTERING.
by E. S. Chang, and R. T. Pu. 1966, 39p NASA-CR-78155
Contract NGR-05-008-005

Descriptors: *Electron scattering, *Helium, *Optical method, Atom, Exchange, Low energy, Optical, Order, Particle, Potential, Second.

For abstract, see STAR 04 22.

N66-37410 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE INSTRUMENT FUNCTION OF A DIAGONAL-MOTION WIDE-ANGLE MICHELSON INTERFEROMETER SPECTROMETER.
by W. D. Johnston III. Jul 66, 35p NASA-TM-X-55560, X-622-66-335

Descriptors: *Michelson interferometer, *Spectrometer, *Wide angle lens, Angle, Configuration, Diagonal, Effect, Function, Instrument, Lens, Mirror, Motion, Resolution, Wide.

For abstract, see STAR 04 22.

N66-37582 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Rochester Univ., N. Y. Inst. Of Optics.
PROPERTIES OF MULTILAYER FILTERS INTERIM REPORT, MAR. 1 - AUG. 31, 1966.
by P. W. Baumeister. 1966, 26p NASA-CR-78341
Grant NSG-308-63

Descriptors: *Band pass filter, *Metal film, *Multilayer structure, Aluminum, Design, Dielectrics, Fabrication, Film, Gold, Indium, Interference, Layer, Property, Spectrum, Thin.

For abstract, see STAR 04 22.

AD-444 180 **See Field 17E**

AD-468 433 **See Field 20E**

AD-640 588 **See Field 14B**

AD-640 669 **See Field 20B**

AD-640 675 **See Field 20L**

AD-640 684 **See Field 20L**

AD-640 741 **See Field 20E**

AD-641 065 **See Field 20J**

AD-641 208 **See Field 7D**

AD-641 260 **See Field 20L**

20G. PARTICLE ACCELERATORS

AD-640 642 **Field 20G**
Not available from CFSTI.
Air Force Cambridge Research Labs., H. G. Hanscom Field, Mass.
MOLECULAR BEAMS FORMED BY ARRAYS OF 3-40-MICRONS DIAMETER TUBES.
Physical sciences research papers,
by A. T. Stair Jr, John C. Johnson, and James L. Pritchard. 5 Nov 65, 12p AFCRL-PSRP-251, AFCRL-66-514
Proj. AF-8658
Task 865801
Revision of manuscript submitted 2 Sep 65. Prepared in cooperation with Utah State Univ., Bedford, Mass., Concord Radiance Lab. and Idealab. Inc., Franklin, Mass.
Availability: Published in Journal of Applied Physics v37 n4 p1551-8 Mar 15 1966.

Descriptors: (*Molecular beams, *Collimators), Glass, Pipes.

The results of an experimental investigation of molecular beams formed by a closely packed array of glass tubes of uniform diameter are presented. The sets of tubes used (which are commercially available) ranged in diameter from 3 to 40 microns with length-to-diameter ratios of 12 to 100, and were driven by pressures extending from 0.025 to 15 Torr. The experimentally determined functional variations for flux density, on-axis intensity, and beam half-width (conditions L> lambda and a <<L) are given. It was found experimentally that the flux is approximately 2/3 of that predicted theoretically, the beam width is twice that predicted theoretically, and the prediction for center line intensity is modified by (a/a.) to the 1/3 power. The dependence of the beam intensity on the tube radius is attributed to self-scattering due to the dense packing of many tubes. (Author)

SLAC-65 **Field 20G**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Linear Accelerator Center, Stanford Univ., Calif.
TWO-MILE ACCELERATOR PROJECT.
Quarterly status rept., Jan 1-Mar 31, 1966.
Jun 66, 88p
Contract AT (04-3)-400

Descriptors: (*Linear accelerators, Instrumentation), (*Particle accelerators, Electron beams).

For abstract, see NSA 20 21.

UCRL-16809 **Field 20G**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
BEVATRON OPERATION AND DEVELOPMENT, 49, JANUARY-MARCH 1966,
by Kenneth C. Crebbin, Fred H. G. Lothrop, and Robert Frias. 24 May 66, 20p
Contract W-7405-eng-48

Descriptors: (*Bevatrons, Reactor shutdown), (*Proton beams, Acceleration).

For abstract, see NSA 20 21.

ORNL-3924 **See Field 18D**

20H. PARTICLE PHYSICS

AD-640 634 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park. Research Center.
RETROFUGAL FLUX OF ELECTRONS FROM A MONOENERGETIC BEAM DIRECTED AT A THICK TARGET.
Final rept., 1 Dec 64-31 Jan 66,
by Ralph Dressel. Sep 66, 4p
Grant DA-ARO (D)-31-124-G626
Proj. 4678-P
AROD-4678:3

Descriptors: (*Electron beams, Backscattering), Secondary emission, Particle accelerator targets, Spectroscopy.

A brief survey is given of studies involving the measurement of the magnitude, the angular distribution, and the energy spectra of those electrons returning from a plane interface irradiated by a collimated beam of monoenergetic electrons.

AD-640 740 **Field 20H**
Not available from CFSTI.
Army Electronics Command, Fort Monmouth, N. J. Inst. for Exploratory Research.
A GENERALIZATION OF THE DIRAC CHORD METHOD TO INCLUDE CHARGED-PARTICLE PHENOMENA.
Revised ed.,
by E. E. Lewis. 18 Feb 66, 6p
Revision of manuscript submitted 17 Nov 65.
Availability: Published in Nuclear Science and Engineering v25 p359-64 1966.

Descriptors: (*Charged particles, Probability), Graphics, Geometry, Transport properties, Emissivity.

The Dirac chord method is applied to the calculation of the escape probability of heavy charged particles from a uniform isotropic source of arbitrary convex geometry. This leads to the distribution of path lengths traveled by particles before escaping from the source. The path-length distribution, which is a function only of the Dirac chord distribution, may be used to average nuclear characteristics over the source geometry. As an illustration, the standard formula for the neutron-escape probability is reproduced. Expressions are then derived for the spectrum and energy self absorption of heavy-charged-particle sources. Specific results for spherical, slab, and cylindrical sources are obtained with the assumption that the range is proportional to an arbitrary power of the particle energy. (Author)

AD-6 832 **Field 20H**
Not available from CFSTI.
Florida State Univ., Tallahassee. Dept. of Physics.
SPECTROSCOPY OF Sm145 via (d,p) REACTIONS.
Revised ed.,
by R. K. Jolly, and C. F. Moore. 13 Dec 65, 9p
Grant AF-AFOSR-440-66
Proj. AF-9751
Task 975102
AFOSR-66-1481
Revision of manuscript submitted 19 Aug 65.
Availability: Published in Physical Review v145 n3 p918-25 May 20 1966.

Descriptors: (*Samarium, *Nuclear spectroscopy), (*Deutron reactions, Samarium), (*Proton reactions, Samarium), Nuclear energy levels, Nuclear models, Deuteron bombardment, Nuclear spins, Parity.

States of Sm145 were investigated via 15-MeV-deuteron-induced (d,p) reactions with an energy resolution of approx. 40 KeV. The angular-distribution data were analyzed using zero-range distorted-wave Born-approximation calculations to extract spectroscopic information. The proton spectra do not show the simple structure that one would expect from the conventional shell model for an 82-neutron target nucleus. Spin and parity assignments for most of the observed levels together with single-particle energies are presented. (Author)

AD-640 833 **Field 20H**
Not available from CFSTI.
Florida State Univ., Tallahassee. Dept. of Physics.
NEUTRON TRANSFER IN HEAVY ION REACTIONS,
by P. J. A. Buttle, and L. J. B. Goldfarb. 2 Jul 65, 26p
Grant AF-AFOSR-440-66
Proj. AF-9751
Task 975102
AFOSR-66-1480
Availability: Published in Nuclear Physics v78 p409-32 1966.

Descriptors: (*Ion bombardment, *Neutron reactions), (*Nuclear spectroscopy, Neutron reactions), (*Nitrogen, Ion bombardment), Wave functions, Nuclear cross sections, Nuclear energy levels.

A DWBA treatment of the heavy-ion neutron transfer reaction is given which is suitable for energies below the Coulomb barrier where the transition amplitude may be evaluated with reasonable accuracy. Consideration is given of the post-prior paradox, virtual Coulomb excitation and of effects associated with antisymmetrization. The 14N (14N, 13N) 15N reaction is taken as an example and calculations are made of angular distributions and total cross section for several energies. The results are very similar to those obtained using the tunnelling theory of Breit et al. Good agreement is also obtained with the experimental data of Hiebert, Couch and McIntyre, which thus points further to the feasibility of estimations of single-particle neutron reduced widths, based on the study of heavy-ion reactions. (Author)

AD-640 834 **Field 20H**
Not available from CFSTI.
Florida State Univ., Tallahassee. Dept. of Physics.
ISOBARIC ANALOGUE STATES IN HEAVY NUCLEI. III. TIN ISOTOPES,
by P. Richard, C. F. Moore, J. A. Becker, and J. D. Fox. 3 Jan 66, 13p
Grant AF-AFOSR-440-66
Proj. AF-9751
Task 975102
AFOSR-66-1489
See also AD-640 364.
Availability: Published in Physical Review v145 n3 p971-81 May 20 1966.

Descriptors: (*Tin, *Nuclear isobars), (*Proton bombardment, Tin), Nuclear resonance, Nuclear energy levels, Nuclear spectroscopy, Proton reactions, Neutron reactions, Elastic scattering, Isotopes.

Isobaric analogue resonances have been identified in (p,p) and (p,n) excitation functions on the target isotopes Sn112, Sn114, Sn117, Sn118, Sn119, Sn116, Sn120, Sn122, and Sn124. All the resonances observed on the even isotopes were analyzed using a Coulomb-plus-single-level formula. Level separations, 1-value determinations, spreading widths, spectroscopic factors, and Coulomb displacement energies are discussed. The spectroscopic information from (d,p) on the same targets are compared to the analogue results. (Author)

AD-640 871 **Field 20H, 3B**
CFSTI Prices: HC$1.10 MF$0.50
Falkiner Nuclear Dept., Univ. of Sydney (Australia).
A NEW METHOD OF RECORDING LARGE COSMIC RAY AIR SHOWERS,
by C. B. A. McCusker, and M. M. Winn. 1963, 10p
Grant AF-AFOSR-62-410

Descriptors: (*Cosmic rays, Measurement), Recording systems, Abundance, Australia.

The difficulty of recording fast timing information in a large air shower array is discussed and a possible solution to this problem is proposed. The time of passage of shower fronts at each detector station in the array is to be measured with respect to the time as given by a time signal transmitter in or near the array. Details of the method are given. (Author)

AD-640 915 **Field 20H**
Not available from CFSTI.
Bartol Research Foundation, Franklin Inst., Swarthmore, Pa.
GAMMA-RAY ANGULAR DISTRIBUTIONS IN INELASTIC NUCLEON SCATTERING VIA COMPOUND NUCLEUS MECHANISM,
by Douglas M. Van Patter. 1966, 30p
Grants AF-AFOSR-401-66, NSF-GP-3745
Proj. AF-9751
Task 975102
AFOSR-66-1505
Availability: Published in Nuclear-Spin Parity Assignments p244-70 1966.

Descriptors: (*Nuclear spins, Analysis), (*Nuclear scattering, *Gamma emission), Nucleons, Inelastic scattering, Nuclear energy levels, Neutrons, Nuclear structure, Gamma-ray spectra.

The characteristics of energy-averaged angular distributions of gamma rays following inelastic scattering via compound nucleus formation are discussed. The large spin sensitivity of such distributions for ground-state transitions in even-even nuclei has provided the basis for many reliable spin assignments. Examination of the predicted behavior of (n,n'gamma) distributions near threshold has disclosed features deserving of further study. The influence of multipole mixing is emphasized, particularly for 3 (D,Q)2 transitions, whose distributions are especially sensitive to this parameter. A detailed example of the effects of cascades from higher levels is presented. (Author)

AD-640 943 **Field 20H**
Not available from CFSTI.
Texas A and M Univ., College Station.
APPLICATION OF THE PADE APPROXIMANT TO SCATTERING THEORY,
by J. L. Gammel, and F. A. McDonald. 2 Jul 65, 11p
Grant AF-AFOSR-918-65
Proj. AF-9751
Task 975101
AFOSR-66-1331
Availability: Published in The Physical Review v142 n4 p1245-54 Feb 25 1966.

Descriptors: (*S-matrix, *Nuclear scattering), Approximation (Mathematics), Theory, Inelastic scattering, Elastic scattering, Phase shift.

Identifiers: Pade approximation.

The Pade approximant is shown to yield exactly unitary S matrices in scattering theory. The method is used to construct a unitary S matrix for n-d scattering above the threshold for inelastic scattering. Thus the effect of inelastic scattering on elastic-scattering total cross sections and angular distributions is calculated. No cusps are found at the threshold. (Author)

AD-640 998 **Field 20H**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
COVALENCY CRITERION FOR LOCALIZED VS COLLECTIVE ELECTRONS IN OXIDES WITH THE PEROVSKITE STRUCTURE,
by John B. Goodenough. 1966, 9p MS-1475
Contract AF 19(628)-5167
ESD-TR-66-223
Availability: Published in Journal of Applied Physics v37 n3 p1415-22 Mar 1 1966.

Descriptors: (*Oxides, Atomic properties), (*Transition elements, Oxides), Valence, Complex compounds, Band theory of solids, Atomic orbitals, Atomic structure, Magnetic properties, Electrical properties, Electrons.

In many oxides the outer d electrons are not localized, magnetic electrons but collective, metallic electrons either as a result of cation-sublattice band formation or of covalent mixing of anion p and cationic d states. It is shown that cation-sublattice band formation does not take place in oxides with ReO3 or perovskite structure and that they are therefore suitable for testing any covalency criterion for the magnetic vs metallic state. A parametric criterion is developed from physical arguments, and it is used to interpret systematically the magnetic and electric properties of oxides with the perovskite structure. The role of the Hartree-Fock intra-atomic exchange correlations is found to be important, and the physical origin of the ferroelectric transitions is identified. (Author)

AD-641 034 **Field 20H, 18D, 20J**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Physics.
ACCURACY OF MEASUREMENT FOR COUNTING AND INTENSITY-CORRELATION EXPERIMENTS,
by Marvin L. Goldberger, and Kenneth M. Watson. 15 Jun 65, 13p
Grant AF-AFOSR-130-65
Proj. AF-9767
Task 976701
AFOSR-66-1588
Availability: Published in Physical Review v140 n2B pB500-9 Oct 25 1965.

Descriptors: (*Elementary particles, Counting methods), (*Counting methods, *Quantum mechanics), Intensity, Correlation techniques, Particle beams, Wave functions, Radiation measurement systems, Nuclear scattering.

A quantum-mechanical analysis is made of the experimental accuracy to be expected for particle-counting and intensity-correlation experiments. The mean-square fluctuation for an ensemble, consisting of a large number of experiments each conducted over a time interval T, is calculated. (Author)

AD-641 046 **Field 20H, 20L**
Not available from CFSTI.
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
CERENKOV RADIATION IN INHOMOGENEOUS PERIODIC MEDIA,
by K. F. Casey, C. Yeh, and Z. A. Kaprielian. 4 Jun 65, 10p
Grant AF-AFOSR-496-65
Proj. AF-4751
AFOSR-66-0537
Availability: Published in Physical Review v140 n3B pB768-75 Nov 8 1965.

Descriptors: (*Cerenkov radiation, *Dielectrics), (*Charged particles, Cerenkov radiation), Numerical analysis, Electrons, Crystal lattices, Periodic variations.

The formal exact solution to the problem of the radiation of a charged particle traveling with a constant velocity in a periodically inhomogeneous medium is obtained. As a specific example, the case with a sinusoidally varying dielectric profile is treated in detail. Results of the computation are summarized in two graphs from which information concerning threshold velocity for a particular mode, the emission angles for various radiating modes, and the cutoff frequency for a certain mode can be found. Unlike the case of Cerenkov radiation in a homogeneous medium, there exist radiating modes in this inhomogeneous-dielectric case even when the velocity of the charged particle is below the threshold Cerenkov velocity. A formal expression for the radiation spectrum is also given. Approximate expressions for the radiated fields and for the radiation spectrum are obtained when the variation of the permittivity is small. Results are discussed and interpreted. (Author)

AD-641 050 **Field 20H**
Not available from CFSTI.
Institute for Advanced Study, Princeton, N. J.
INCOHERENT DROPLET MODEL OF HIGH-ENERGY LARGE-ANGLE SCATTERING,
by Kerson Huang. 17 Jan 66, 5p
Grant AF-AFOSR-42-65
Proj. AF-9751
Task 975101
AFOSR-66-1691
Availability: Published in Physical Review v146 n4 p1075-9 Jun 24 1966.

Descriptors: (*Nuclear scattering, Theory), (*Proton scattering, Theory), Momentum, Vector analysis, Mathematical models.

The high-energy large-angle scattering between two hadrons is thought of as incoherent scattering between two objects of complicated internal structure. A model is proposed whereby the incoherence is simulated by a simple recipe. Consequences of the model can be deduced simply. The salient feature of the result is that transverse momentum transfer is strongly inhibited for kinematical reasons. Orear's empirical fit for large-angle p-p scattering is obtained. (Author)

AD-641 095 **Field 20H**
Not available from CFSTI.
Maryand Univ., College Park. Dept. of Physics and Astronomy.
THEORY OF INELASTIC SCATTERING OF ELECTRONS,
by A. J. Glick. 1965, 12p
Grant AF-AFOSR-735-65
Proj. AF-9761
Task 976101
AFOSR-66-1294
Availability: Published in Laboratory Investigation v14 n6 pt2 p49-58 1965.

Descriptors: (*Electrons, *Inelastic scattering), Theory, Dielectric properties, Excitation.

A brief summary of the theory of inelastic electron scattering by thin films. The scattering cross section is related to the frequency and wave numbers dielectric function of the film. The electron excitation spectrum in the solid determines the dielectric constant and the resultant cross section includes both single particle and collective effects. (Author)

AD-641 115 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
High Energy Physics Lab., Stanford Univ., Calif.
EXCITATION OF 31P AND 32S BY 180 DEGREE ELECTRON SCATTERING,
by P. Kossanyi-Demay, and G. J. Vanpraet. Aug 66, 23p HEPL-394-Rev.
Contract Nonr-225 (67)
This report constitutes a revision of AD-626 684.

Descriptors: (*Nuclear energy levels, Excitation), (*Phosphorus, Electron bombardment), (*Sulfur, Electron bombardment), Nuclear cross sections, Electron beams, Inelastic scattering, Differential cross section, Nuclear resonance.

Measurement was made of the differential cross sections for inelastic scattering of 50 MeV electrons at 180 deg. by 31P and 32S nuclei. Using the long wave length approximation, lower limits for radiation widths were derived for the levels. For 32S the giant dipole resonance was investigated, and the results are compared with a recent calculation of B. M. Spicer. (Author)

AD-641 192 **Field 20H, 20J**
CFSTI Prices: HC$6.00 MF$1.25
Instituto de Investigacion Aeronautica Espacial, Buenos Aires (Argentina). Laboratorio de Radiaciones.
PHENOMENOLOGICAL AND MICROSCOPIC ANALYSIS OF PROPERTIES OF EVEN-EVEN NUCLEI. PART C. MICROSCOPIC MODELS,
by C. A. Heras, S. M. Abecasis, and H. E. Bosch. Mar 66, 236p
Grant DA-ARO-49-092-65-G78
Prepared in cooperation with La Plata Univ. (Argentina). See also AD-624 028.

Descriptors: (*Even-even Nuclei, *Nuclear models), Nuclear properties, Nuclear reactions, Groups (Mathematics), Nuclear particles, Hartree-Fock approximation, Nuclear energy levels, Green's function, Argentina.

Identifiers: Quasiparticles.

Partial contents: Residual interactions; (The pairing force, The quadrupole-quadrupole force, Special interactions, General central interactions); Methods of the theory of groups; (The SU3 classification scheme, General technique, Application to, pairing interactions, Comparison with experiment); Particle-hole interaction; The interacting-quasiparticle picture; (The Hartree-Fock-Bogoliubov method, The independent-quasiparticle approximation, Charge-independent pairing correlations, Quasiparticle interactions, The quasibosons

approximation, The cranking model approach); Microscopic description of properties of medium weight and heavy nuclei; (Two-quasiparticle states, Vibrations, Rotational modes, Deformations); More about the interacting quasiparticle picture: (The Green function technique, Analysis of the particle-number non conservation, Higher approximations, Extensions of the Hartree-Fock-Bogoliubov method).

AD-641 240 **Field 20H, 20J**
Not vailable from CFSTI.
Colorado Univ., Boulder. Dept. of Physics.
MASS SPECTRUM FROM NON-COMPACT GROUPS,
by A. O. Barut. 1965, 18p
Grant AF-AFOSR-30-63
Proj. AF-9751
Task 975101
AFOSR-66-0792
Availability: Published in High-Energy Physics and Elementary Particles p679-94 1965.

Descriptors: (*Quantum mechanics, *Mass spectrum), (*Particle spectra, Nuclear structure), Invariance, Groups (Mathematics), S-matrix.

The mass differences of particles are considered from the beginning as part of the general symmetry considerations. The paper is mainly concerned with the symmetry properties of the particles at rest considered as bound states for composite particles. (Author)

AD-61 243 **Field 20H**
Not available from CFSTI.
Colorado Univ., Boulder. Dept. of Physics.
PRODUCTION AMPLITUDES. I. CONSTRUCTION OF INVARIANT AMPLITUDES,
by A. O. Barut, and Y. C. Leung. 28 Dec 64, 10p
Grant AF-AFOSR-30-63
Proj. AF-9751
Task 975101
AFOSR-66-0830
Prepared in cooperation with International Centre for Theoretical Physics, Trieste (Italy).
Availability: Published in The Physical Review v138 n5B pB1119-27 Jun 7 1965.

Descriptors: (*Pair production, *Nuclear scattering), Nuclear spins, Pions, Nucleons, Photons, Neutrinos, Invariance.

Identifiers: Scattering amplitude.

Lorentz-covariant scattering amplitudes for production processes involving both massive and massless particles are systematically discussed. Explicit forms of both the spin and the isospin amplitudes for production processes involving pions, nucleons, photons, and neutrinos, as well as the crossing relations in both spin and isospin variables, are given. (Author)

AD-641 281 **Field 20H, 12A, 20C**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Los Angeles. Plasma Physics Group.
THE GUIDING CENTER APPROXIMATION IN LOWEST ORDER,
by Alfredo Banos, Jr. Sep 66, 31p
Contract Nonr-4756 (01)

Descriptors: (*Charged particles, *Magnetic moments), (*Approximation (Mathematics), *Equations of Motion), Invariance, Vector analysis.

The report is concerned with a simple and direct derivation of the equations governing the motion of a charged particle in space and time dependent electric and magnetic fields in the so-called guiding center approximation. Attention is given exclusively to results in lowest order in an expansion in reciprocal powers of the cyclotron frequency. As is well known, results to lowest order are the most frequently employed for practical as well as for didactic reasons. Yet, to the author's knowledge, there appear to be no elementary derivations of these results, which are at once general and comprehensive, but which do not employ the complicated machinery of the formal asymptotic expansions of Bogolyubov and Zubarev and of Kruskal.

N66-30027 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Centro Brasileiro De Pesquisas Fisicas, Rio De Janeiro.
THE HIGH ENERGY BEHAVIOR OF THE SCATTERING AMPLITUDE FOR NEGATIVE MOMENTUM TRANSFER.
by S. W. Mc dowell. 1964, 15p
Sponsored By Nsf Its Notas De Fis., Vol. 11, No. 14

Descriptors: *Momentum transfer, *Scattering amplitude, *Theoretical physics, Amplitude, Angular, Channel, Crossed, Momentum, Physics, Regge parameter, Scattering, Theoretical, Threshold, Transfer.

For abstract, see STAR 04 17.

N66-30029 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Centro Brasileiro De Pesquisas Fisicas, Rio De Janeiro.
APPARENT CP VIOLATION IN K SUPER O SUB 2 DECAY DUE TO A NEUTRAL VECTOR BOSON.
by P. P. Srivastava, and A. Vidal. 1964, 12p
Its Notas De Fis., Vol. 11, No. 16

Descriptors: *Boson, *Invariance, *Kaon, *Particle decay, Coupling, Current, Decay, Elementary, Interaction, Meson, Neutral, Particle, Strangeness, Vector, Violation, Weak.

For abstract, see STAR 04 17.

N66-30124 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
A CALCULATION OF THE FLUX AND ENERGY SPECTRUM OF SECONDARY ELECTRONS AT HIGH ALTITUDES IN THE ATMOSPHERE.
by S. D. Verma. May 66, 45p NASA-CR-76099, EFINS-66-44
Grant NSG-144-61

Descriptors: *Electron flux, *Energy spectrum, *Secondary emission, *Upper atmosphere, Atmosphere, Calculation, Emission, Energy, Meson, Nucleon, Particle, Secondary, Spectrum, Upper.

For abstract, see STAR 04 17.

N66-30156 **Field 20H**
CFSTI Prices HC$2.50 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PARTICLES AND FIELDS RESEARCH BIBLIOGRAPHY WITH AUTHOR INDEX, JAN. 1958 - MAY 1966.
by W. N. Hess, and G. D. Mead. 1966, 173p
NASA-SP-7026

Descriptors: *Bibliography, *Cosmic radiation, *Electric field, *Elementary particle, *Magnetic field, Aurora, Belt, Comet, Cosmic, Electric, Elementary, Energetic, Field, Galaxy, Geomagnetic, Interaction, Magnetic, Neutron, Particle, Proton, Radiation, Solar.

For abstract, see STAR 04 17.

N66-30334 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ELECTRONS IN THE VAN ALLEN ZONE MEASURED WITH A SCINTILLATOR ON EXPLORER XIV.
by L. R. Davis, G. Pizzella, and J. M. Williamson. Mar 66, 46p NASA-TM-X-55511, X-611-66-112

Descriptors: *Electron energy, *Energy spectrum, *Van allen belt, Aurora, Belt, Electron, Energy, Equator, Field, Geomagnetic, Measurement, Radiation, Region, Scintillator, Spectrum.

For abstract, see STAR 04 17.

N66-30336 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROPAGATION OF COSMIC RAY NUCLEI IN COSMIC RAY SOURCES, INTERSTELLAR SPACE AND SOLAR SYSTEM.
by N. Durgaprasad. Mar 66, 32p NASA-TM-X-55513, X-611-66-114

Descriptors: *Cosmic ray propagation, *Interstellar space, *Solar system, Alpha, Cosmic, Diffusion, Energy, Heavy, Helium, Interstellar, Nucleon, Nucleus, Particle, Propagation, Proton, Ray, Solar, Source, Space, Spectrum, System.

For abstract, see STAR 04 17.

N66-30347 **Field 20H**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE SOURCE SPECTRA AND COMPOSITION OF COSMIC RAYS IMPLIED BY AN ANALYSIS OF INTERSTELLAR AND INTERPLANETARY TRAVEL.
by C. E. Fichtel, and D. V. Reames. Apr 66, 58p NASA-TM-X-55524, X-611-66-164

Descriptors: *Cosmic ray, *Interstellar travel, Composition, Cosmic, Cross section, Galaxy, Helium, Interaction, Interplanetary, Interstellar, Modulation, Nucleus, Proton, Ray, Solar, Source, Spectrum, Travel.

For abstract, see STAR 04 17.

N66-30351 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics nd Space Administration. Goddard Space Flight Center, Greenbelt, Md.
QUASI-BIENNIAL VARIATIONS OF COSMIC-RAY INTENSITIES.
by K. Maeda, and T. Suda. Apr 66, 33p NASA-TM-X-55528, X-640-66-174
Submitted For Publication

Descriptors: *Cosmic ray, *Radiation intensity, Chamber, Cosmic, Equator, Geomagnetic, Geophysics, Intensity, Ion, Meteorology, Muon, Oscillation, Radiation, Ray, Stratosphere, Variance.

For abstract, see STAR 04 17.

N66-30591 **Field 20H**
CFSTI Prices HC$3.00 MF$0.75
State Univ. Of Iowa, Iowa City. Dept. Of Physic: And Astronomy.
THE TEMPORAL VARIATIONS OF ELECTRON INTENSITIES AT LOW ALTITUDES IN THE OUTER RADIATION ZONE AS OBSERVED WITH SATELLITE INJUN 3 PROGRESS REPORT, JAN. 1 - JUL. 31, 1963.
by J. D. Craven. Apr 66, 83p NASA-CR-76252
Grant NSG/T/-6, Contract NONR-1509/06/
Its Rept.-66-12

Descriptors: *Electron intensity, *Geomagnetically trapped particle, *Injun iii satellite, *Magnetic field disturbance, *Outer radiation belt, Altitude, Belt, Disturbance, Electron, Field, Geomagnetic, Intensity, Low, Magne-

tic, Observation, Outer, Particle, Radiation, Satellite, Temporary, Trapping, Variation.

For abstract, see STAR 04 17.

N66-30747 **Field 20H**
CFSTI Prices HC$4.00 MF$0.75
New Hampshire Univ., Durham. Dept. Of Physics.
VIOLATION OF THE SECOND AND THIRD ADIABATIC INVARIANTS BY HYDROMAGNETIC WAVES.
by B. J. Conrath. Oct 65, 117p NASA-CR-76294
Grant NSG-624

Descriptors: *Charged particle, *Geophysics, *Magnetohydrodynamic wave, *Particle motion, Charge, Electromagnetic, Field, Hydromagnetic, Motion, Particle, Violation, Wave.

For abstract, see STAR 04 17.

N66-31205 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Laboratoire De Physique Theorique Et Des Hautes Energies, Orsay (France).
THE KINETIC THEORY WITHOUT DIFFICULTY.
La Theorie Cinetique Sans Peine
by J. Ginibre. May 66, 31p TH/150
In French

Descriptors: *Bogoliubov theory, *Boltzmann equation, *Correlation function, *Kinetic theory, *Liouville equation, Algebra, Calculation, Collision, Correlation, Elastic, Energy, Equation, Function, Hierarchy, Integral, Interaction, Irreversibility, Kinetic, Mechanics, Nucleus, Operator, Particle, Physics, Probability, Solution, Statistical, Theory.

For abstract, see STAR 04 17.

N66-31359 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa.
ATMOSPHERIC TRANSITION CURVES FOR GEOMAGNETICALLY-SENSITIVE COSMIC RAYS FINAL REPORT.
by R. C. Good Jr. Mar 66, 45p NASA-CR-66110
Contract NAS1-5254

Descriptors: *Atmospheric neutron flux, *Cosmic ray, *Geomagnetic effect, Atmosphere, Cascade, Cosmic, Curve, Effect, Flux, Geomagnetic, Neutron, Nuclear, Physics, Proton, Ray, Sensitivity, Transition.

For abstract, see STAR 04 17.

N66-31374 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. Of Chemistry.
RECOIL RANGES OF PRODUCTS FROM REACTIONS OF CU65 WITH 11-33 ME V HE3 IONS.
by N. T. Porile, and G. B. Saha. 1965, 14p
NASA-CR-76396
Contract NGR-15-005-021

Descriptors: *Copper, *Helium 3, *Recoil atom, Atom, Excitation, Formation, Function, Ion, Nucleus, Radiochemistry, Range, Reaction, Recoil.

For abstract, see STAR 04 17.

N66-31745 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Yale Univ. Observatory, New Haven, Conn.
INVESTIGATIONS OF THE INTERACTION OF SOLAR FLARE PARTICLE WITH THE CORONAL PLASMA FINAL REPORT.
by L. Oster. 1966, 8p NASA-CR-76457
Grant NSG-176-61

Descriptors: *Bibliography, *Corona discharge, *Solar flare, Burst, Corona, Discharge, Electron, Emission, Flare, Interaction, Particle, Plasma, Prominence, Radiation, Radio, Resonance, Solar.

For abstract, see STAR 04 17.

N66-31785 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.h., Seibersdorf (Austria). Reaktorzemtrum.
MULTIPLE ELECTRON SCATTERING IN THIN FOILS.
by H. Paul, and W. Tatzber. 1966, 36p SGAE-PH-40/1966
Submitted For Publication

Descriptors: *Angular distribution, *Electron scattering, *Monte carlo method, Angular, Backscatter, Calculation, Coefficient, Cross section, Distribution, Electron, Energy, Foil, Monodirectional, Program, Thin, Transmission.

For abstract, see STAR 04 17.

N66-31897 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla.
FLARE HAZARDS AT SOLAR MINIMUM - DOSIMETRIC EVALUATION OF THE CLASS 2 FLARE OF FEBRUARY 5, 1965.
by H. J. Schaefer. Jun 66, 20p NASA-CR-76518, NAMI-970
NASA ORDER R-75
Joint Rept. With Nasa

Descriptors: *Apollo project, *Dosimetry, *Proton beam, *Radiation hazard, *Shielding, *Solar flare, Beam, Differential, Distribution, Energy, Exposure, Flare, Flight, Flux, Gemini project, Hazard, Minimum, Orbit, Polar, Proton, Radiation, Satellite, Semiinfinite, Slab, Solar, Space, Spectrum, Tissue.

For abstract, see STAR 04 17.

N66-32254 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Pittsburgh Univ., Pa. Space Research Coordination Center.
EXTENSIONS OF THE MOMENTUM TRANSFER THEOREM.
by E. Gerjuoy. 28 Jan 66, 15p NASA-CR-76651, SRCC-26
Grant NSG-416

Descriptors: *Energy transfer, *Momentum transfer, *Theoretical physics, Atom, Collision, Electron, Energy, Extension, Hydrogen, Momentum, Physics, Scattering, Theorem, Theoretical, Transfer.

For abstract, see STAR 04 17.

N66-32371 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
India. Dept. Of Atomic Energy, Bombay.
KERN AND PAR PROGRAMS FOR COMPUTING SCATTERING KERNELS IN H2 O, D2 O AND POLYETHYLENE.
by S. V. Lawande. 1966, 18p AEET-246

Descriptors: *Computer program, *Inelastic scattering, *Moderator, *Thermal neutron, Bond, Chemical, Computer, Deuterium, Engineering, Fortran, Inelasticity, Kernel, Neutron, Nuclear, Nucleus, Oxide, Polyethylene, Program, Scattering, Target, Thermal, Water.

For abstract, see STAR 04 17.

N66-32381 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Comitafo Nazionale Per L Energia Nucleare, Frascati (Italy).
ASYMMETRY RATIOS IN THE PHOTOPRODUCTION OF PIPLUS BY LINEARLY POLARIZED GAMMA RAYS IN THE ENERGY RANGE 200 - 400 ME V.
by P. Gorenstein, M. Grilli, M. Nigo, E. Schiavuta, and F. Soso. 13 Apr 66, 11p LNF-66/23
Its Nota Interna No. 320

Descriptors: *Elementary particle, *Photoproduction, *Pion, Asymmetry, Elementary, Gamma, Interaction, Linear, Neutron, Particle, Polarization, Positive, Proton, Ratio, Ray.

For abstract, see STAR 04 17.

N66-32530 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Centro Brasileiro De Pesquisas Fisicas, Rio De Janeiro.
ON THE POLES OF THE S-MATRIX FOR LONG RANGE POTENTIALS.
by E. M. Ferreira, and A. F. Teixeira. 1965, 44p
Its Vol. 11, No. 15

Descriptors: *Coulomb potential, *Pole, Complex, Infinite, Matrix, Momentum, Nonrelativistic, Plane, Radius, Screen.

For abstract, see STAR 04 17.

N66-32556 **Field 20H**
CFSTI Prices HC$2.50 MF$0.75
European Atomic Energy Community, Brussels (Belgium).
PROPOSAL OF A NEW COLD NEUTRON FACILITY. DESIGN STUDY OF A CROSS CHOPPER.
by H. Geist, and H. Meister. May 66, 69p EUR-2964.E

Descriptors: *Aluminum, *Chopper, *Cold neutron, *Elastic scattering, *Single crystal, Angle, Beam, Bragg equation, Cold, Cross, Crystal, Current, Double, Elastic, Flux, Input, Monochromatic, Neutron, Reflection, Scattering, Single, Spectrometer.

For abstract, see STAR 04 17.

N66-37044 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
AN IMPROVED ANALYSIS OF SPHERE TRANSMISSION EXPERIMENTS FOR AVERAGE CAPTURE CROSS SECTIONS.
by D. Bogart. 1966, 17p NASA-TM-X-52235
Presented At Conf. On Nucl. Data - Microscopic Cross Sect. And Other Data Basic For Reactors, Paris, 17-21 Oct. 1966

Descriptors: *Monte carlo method, *Neutron cross section, *Reactor physics, *Scattering cross section, Antimony, Cross section, Gold, Iodine, Neutron, Physics, Reactor, Resonance, Scattering, Silver.

For abstract, see STAR 04 22.

N66-37209 **Field 20H**
CFSTI Prices HC$3.00 MF$0.75
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
MODEL RING CURRENT BELTS.
bS.-I. Akasofu. Jul 66, 63p NASA-CR-78122
Grants NSG-233-62, NSG-201-62
Its Rept.-66-28

Descriptors: *Mathematical model, *Radiation belt, *Ring current, Belt, Calculation, Current, Distortion, Field, Line, Mathematics, Model, Radiation, Ring, Storm, Table, Time.

For abstract, see STAR 04 22.

N66-37210 Field 20H
CFSTI Prices HC$2.00 MF$0.50
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
EXPLORER 12 OBSERVATIONS OF CHARGED PARTICLES IN THE INNER RADIATION ZONE.
by K. L. Ackerson, and L. A. Frank. Jun 66, 46p
NASA-CR-78123
Grant NSG-233-62, Contract NONR-1509/06/
Its Rept.-66-13

Descriptors: *Charged particle, *Explorer xii satellite, *Inner radiation belt, *Satellite observation, Belt, Charge, Energy, Inner, Observation, Particle, Proton, Radiation, Satellite, Zone.

For abstract, see STAR 04 22.

N66-37276 Field 20H
CFSTI Prices HC$1.00 MF$0.50
New Hampshire Univ., Durham. Dept. Of Physics.
INVESTIGATION OF ENERGY LEVELS IN FOIL EXCITED ATOMIC BEAMS SEMIANNUAL STATUS REPORT, 1 FEB. - 31 JUL. 1966.
by E. L. Chupp, and L. W. Dotchin. 29 Aug 66, 14p NASA-CR-78153
Contract NGR-30-002-018

Descriptors: *Atomic beam, *Energy level, *Lifetime, *Population, Atom, Beam, Energy, Excitation, Foil, Helium, Hydrogen, Level, Relative.

For abstract, see STAR 04 22.

N66-37285 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ON THE NATURE OF X-RAY EMISSION OF RADIOGALAXIES.
bl. S. Shklovskiy. 5 Aug 66, 17p NASA-CR-78203, ST-IGA-10506
Contract NAS5-9299
Transl. Into English Of The Russian Manuscript "o Prirode Rentgenovskogo Izlucheniya Radiogalaktik" Submitted For Publication

Descriptors: *Radio galaxy, *X-ray, Band, Emission, Frequency, Galaxy, Gas, Mass, Optical, Radiation, Radio, Synchrotron, Thermal.

For abstract, see STAR 04 22.

N66-37317 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Maryland Univ., College Park.
ELECTRON IMPACT BROADENING OF ISOLATED ION LINES.
by H. R. Griem. 1966, 14p NASA-CR-78201
Contract NGR-21-002-073

Descriptors: *Electron impact, *Ion, *Spectral line width, Broadening, Collision, Coulomb collision, Equation, Frequency, Isolation, Perturbation, Plasma, Pressure, Transition.

For abstract, see STAR 04 22.

N66-37415 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Electronics Research Center, Cambridge, Mass.
ABSOLUTE PHOTON YIELDS OF LIGHT ELEMENTS BY DEUTERON BOMBARDMENT.
by A. J. Caruso, and R. A. Walter. Oct 66, 14p
NASA-TN-D-3648
Contract 125-24-01-05-80

Descriptors: *Deuteron irradiation, *K-shell, *Radiation measurement, *X-ray, Bombardment, Boron, Bremsstrahlung, Carbon, Counter, Deuteron, Distribution, Electron, Height, Irradiation, Measurement, Pulse, Quantum, Radiation, Target.

For abstract, see STAR 04 22.

N66-37560 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Arizona Univ., Tucson. Dept. Of Physics.
A TWO-TEMPERATURE STATISTICAL MODEL FOR PARTICLE PRODUCTION AT HIGH ENERGIE.
by T. Bowen, and J. R. Wayland. 21 Jul 66, 24p
NASA-CR-78380
Contract NGR-03-002-071

Descriptors: *Elementary particle, *Mathematical model, *Particle production, Antiproton, Cross section, Differential, Distribution, High energy, Interaction, Kaon, Momentum, Pion, Quantum, Statistics, Temperature, Transverse, Two.

For abstract, see STAR 04 22.

N66-37561 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Princeton Univ. Observatory, N. J.
DIPOLE TRANSITION INTEGRALS FOR NONMETAL RESONANCE TRANSITIONS.
by G. M. Lawrence. 20 Apr 66, 18p NASA-CR-78378
Grant NSG-414

Descriptors: *Integral equation, *Nonmetal, *Resonance, *Transition probability, Approximation, Atom, Bates-damgaard calculation, Dipole, Excitation, Ground, Ion, Potential, State, Thomas-fermi theory.

For abstract, see STAR 04 22.

N66-37563 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Princeton Univ., N. J.
RESONANCE TRANSITION PROBABILITIES IN INTERMEDIATE COUPLING FOR SOME NEUTRAL NON MELS.
by G. Lawrence. 1964, 23p NASA-CR-78374
Grant NSG-414
Submitted For Publication

Descriptors: *Neutral element, *Nonmetal, *Resonance, *Transition probability, Arsenic, Bromine, Chlorine, Coupling, Germanium, Iodine, Lead, Line, Orbit, Phosphorus, Selenium, Silicon, Spin, Strength, Sulfur, Wavelength.

For abstract, see STAR 04 22.

N66-37604 Field 20H
CFSTI Prices HC$3.00 MF$0.75
Union Carbide Research Inst., Tarrytown, N. Y. Space Science And Engineering Group.
THEORETICAL CALCULATIONS OF THE BREMSSTRAHLUNG CROSS SECTION.
by H. Brysk, and C. D. Zerby. 24 Jun 66, 93p
NASA-CR-78314, UCC/DSSD-206
Contracts NASW-1235, NASW-906

Descriptors: *Bremsstrahlung, *Computer programming, *Numerical analysis, Angular, Asymptote, Born approximation, Calculation, Cross section, Dirac equation, Distribution, Eigenfunction, Electron, Electrostatic, Element, Energy, Evaluation, Function, Integral, Matrix, Momentum, Phase, Potential, Self-consistent field (scf), Shift, Theoretical, Wave.

For abstract, see STAR 04 22.

PB-173 182 Field 20H
CFSTI Prices: HC$7.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE DES PHENOMENES DE DISPERSION LIES A L'ABSORPTION DE FLUORESCENCE RESONNANTE SANS RECUL DES NOYAUX ATOMIQUES (Study of the Dispersion Phenomena Connected with the Absorption by Recoilless Nuclear Resonance Fluorescence).
Doctoral thesis.
by Pierre Imbert. 18 Dec 65, 75p CEA-R-2925
Text in French: Attached Summary in English.

Descriptors: (*Nuclear resonance, *Fluorescence), (*Mossbauer effect, Fluorescence), Recoil atoms, Iron, Line spectrum, Gamma emission, Magneto-optic effect, Refraction, France.

In nuclear resonance fluorescence, as in the optical field, anormal dispersion curves are related to the absorption lines. It is possible, by using quadrupolar or magnetic splitting of the line in the case of recoilless resonance fluorescence (Mossbauer effect) to obtain differential dispersion effects between the two orthogonal linear or the two inverse circular components of the incident gamma radiation. These effects induce birefraction phenomena or Faraday rotation on the gamma beam, which have been studied on Fe-57 enriched absorbers. (Author)

PB-173 193 Field 20H
CFSTI Prices: HC$38.10 MF$1.7
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
TABLES DE PARCOURS ET DE POUVOIRS D'ARRET DES ELEMENTS CHIMIQUES POUR DES PARTICULES CHARGEES DE 0,1 A 500 MeV D'ENERGIE (Tables of Range and Stopping Power of Chemical Elements for Charged Particles of Energy 0,5 to 500 MeV).
by Claude Francis Williamson, Jean-Paul Boujot, and Jean Picard. Ju 383p CEA-R-3042
Text in French: Attached Summary in English.

Descriptors: (*Particle accelerator targets, Tables), (*Tables, Nuclear properties), Charged particles, Nuclear energy, Particle accelerator techniques, Helium bombardment, Hydrogen, Isotopes.

Identifiers: Range (Particles), Stopping power.

The range, energy loss and differential of rate of energy loss have been tabulated for 37 target materials for all hydrogen and helium ions. The incident energy range covered is from 0.1 to 500 MeV.

PB-173 235 Field 20H
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
UNE ETUDE DE L'INTERACTION POSITIVE-PION-PROTON A 3,5 GeV/c. (A Study of the Positive-Pion-Proton Interaction at 3.5 GeV/c).
Doctoral thesis.
by Nhu Hoa Duong. 13 Jan 66, 87p CEA-R-2948
Text in French: Attached summary in French.

Descriptors: (*Meson reactions, *Pions), (*Proton reactions, Analysis), Nuclear resonance, Nuclear reactions, Decay schemes, Nuclear cross sections, Elastic scattering, Neutrons, France.

Identifiers: Rho mesons.

The positive-pion-proton interaction leading to the production of two charged particles was studied at incident momentums of 3.2 and 3.5 GeV/c. The following were identified: 1741 events of the reaction 'positive-pion + proton yields positive-pion + proton + neutral-pion'; 1100 events of the reaction 'positive-pion + proton yields 2 positive-pions + neutron'; 4079 events of the reaction 'positive-pion + proton to positive-pion + proton'. A study was made of the exchange mechanism in the N*33 production. The resonances N*1/2 (1688), RHO, ETA, Omega, and A1, A2 were observed. Consideration was given to the elastic interaction and various cross-sections.

UCRL-11100 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
AN ELEMENTARY GUIDE TO THE ELEMENTARY PARTICLES,
by Arthur H. Rosenfeld, and Robert D. Tripp. Dec 65, 24p
Contract W-7405-eng-48

Descriptors: (*Elementary particles, Electromagnetism), (*Nuclear particles, Nuclear energy levels).

For abstract, see NSA 20 21.

AD-640 640 See Field 7D

AD-640 662 See Field 20J

AD-640 817 See Field 20J

AD-640 865 See Field 18F

AD-640 888 See Field 18H

AD-641 006 See Field 20J

AD-641 033 See Field 20J

AD-641 035 See Field 20J

AD-641 043 See Field 18H

AD-641 051 See Field 20J

AD-641 062 See Field 18B

AD-641 067 See Field 20J

AD-641 068 See Field 20J

AD-641 237 See Field 20J

AD-641 242 See Field 20J

ORNL-3924 See Field 18D

20I. PLASMA PHYSICS

AD-434 265 Field 20I
CFSTI Price: HC$1.60
Unified Science Associates, Inc., Pasadena, Calif.
STABLE DENSE COLD PLASMA.
Semiannual technical summary rept.,
by S. Naiditch. 31 Mar 64, 13p
Contracts Nonr-3437 (00), ARPA-Order-194

Descriptors: (*Plasma medium, Gases), Liquids, Electrical conductance, Measurement, Hall effect, Hysteresis, Electron density, Pressure, Temperature, Density, Sodium, Ammonia, Diffusion, Solutions.

AD-449 859 Field 20I
CFSTI Price: HC$1.60
GM Defense Research Labs., Sana Barbara, Calif. Aerospace Operations Dept.
ELECTROMAGNETIC WAVE REFLECTION FROM A METAL-BACKED NON-UNIFORM PLASMA LAYER FOR NON-NORMAL INCIDENCE,
by Henry M. Musal Jr. Aug 64, 16p Contract technical note. CTN64-06
Contract DA-04-495-ORD-3567 (Z), ARPA Order-357-63
Proj. 7400
Hypervelocity Range Research Program, a part of Project DEFENDER.

Descriptors: (*Electromagnetic wave reflections, Plasma medium), Plasma physics, Reflection, Electromagnetic fields, Partial differential equations, Boundary value problems, Differential equations.

The calculation of the reflection coefficients for a plane transverse electromagnetic wave incident non-normally on a non-uniform plasma layer with a metal-backing wall is discussed. It is assumed that the plasma properties (plasma frequency and electron collision frequency) vary spatially only in the direction normal to the metal wall. The plasma layer is treated as a spatially non-uniform lossy dielectric material. For non-normal incidence, it is most convenient to consider an arbitrarily polarized incident electromagnetic wave to be composed of TE (transverse electric) and TM modes. The reflection coefficient for each of these different modes is then found separately. (Author)

AD-450 205 Field 20I
CFSTI Price: HC$2.60
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
A NUMERICAL INVESTIGATION OF THE VALIDITY OF THE BORN APPROXIMATION FOR DETERMINATION OF THE REFLECTION COEFFICIENTS OF UNDERDENSE PLASMA SLABS,
by Srblav Zivanovic. Oct 64, 23p Contract technical note CTN64-08
Contract DA-04-495-ORD-3567 (Z), ARPA order-357-63
Proj. 7400
Hypervelocity Range Research Program, a part of Project DEFENDER.

Descriptors: (*Plasma physics, Electron density), (*Electromagnetic wave reflections, Plasma physics), Plasma medium, Gas ionization, Thickness, Wave transmission, Harmonic analysis.

The validity of the Born approximation for determination of the reflection coefficients of plasma slabs is numerically examined for two cases: the uniform underdense plasma slab and a plasma slab with a sunusodial electron density perturbation superimposed on a constant electron density. The regions of validity of the Born approximation are discussed in each case. (Author)

AD-465 104 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
Microwave Electronics Corp., Palo Alto, Calif.
STUDY OF MICROWAVE GENERATION UTILIZING DOUBLESTREAM INSTABILITIES IN ANISOTROPIC MEDIA.
Quarterly progress rept. no. 5, 1 Dec 64-1 Mar 65,
by L. D. Buchmiller, and S. Kakihana. Mar 65, 49p
Contract DA-36-039-AMC-0342 (E)
Proj. DA-1G6-22001A055-04

Descriptors: (*Plasma oscillations, Pyrolytic graphite), (*Infrared detectors, Design), Anisotropy, Stability, Impurities, Zinc, Radiofrequency power, Microwave amplifiers, Electric fields, Magnetic fields, Resistance (Electrical), Voltage, Measurement, X band, Waveguides, Indium alloys, Antimony alloys.

Difficulties were encountered in obtaining a fast-response infrared detector for two-stream instabilities studies with pyrolytic graphite. A zinc-doped germanium detector appears to be the best detector available in the present state-of-the-art and even with this detector the long wavelength cutoff is 40 microns, which falls short of the desired range of 5 to 75 microns, experimental work was concerned principally with collective-phenomena instabilities in the solidstate plasma in N-type indium antimonide (INSB) at 77 K. Oscillations were measured from 33 to 12,000 MC at power levels ranging from O down-to -70 DBM. (Author)

AD-640 582 Field 20I
CFSTI Prices: HC$1.00 MF$0.50
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
STUDY OF BASIC PROCESSES IN GASEOUS DISCHARGE PLASMAS.
Final rept., 1 Jul 60-1 Jul 66.
1 Jul 66, 16p
Contract Nonr-710 (37)
Proj. NR-012-206

Descriptors: (*Gas discharges, Plasma medium), Atomic properties, Molecular properties, Mass spectroscopy.

The report gives a brief summary of the results obtained during the study of collision processes between particles present in a gaseous plasma. A list of publications, verbal presentations and technical reports during the contract period is added. (Author)

AD-640 625 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
SPECTRAL CHARACTERISTICS OF A LOW DENSITY ARC-HEATED NITROGEN PLASMA,
by L. L. Price, and W. K. McGregor. Oct 66, 34p
AEDC-TR-66-139
Contract AF 40 (600)-1200
Projs. AF-8951, ARO-RW2520
Task 895105
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Plasma medium, Spectra (Visible + ultraviolet)), (*Nitrogen, Plasma medium), Argon, Density, Plasma jets, Electric arcs, Heating.

The visible and near ultraviolet spectrum from free jets of nitrogen plasmas produced by an arc-jet and exhausted into a low pressure (approx 1 torr) test cell was photographed under varying conditions. The spectral characteristics were compared to the spectra obtained from argon plasmas produced in the same apparatus. The characteristics of the argon spectra have been attributed to the existence of long-lived, metastable argon atoms; the nitrogen spectral characteristics were found to be interpretable in a similar way. The spectrum consisted of N sub 2 (+) (first negative) and N sub 2 (second positive) band systems, N atomic lines, and strong impurity radiation from OH, NH, and NO. The impurity bands can be explained on the basis of the ambient test cell gases which mix in the jet boundary and become excited by collision of the second kind with nitrogen atomic and molecular metastables. Several gases, chiefly argon, were mixed with the nitrogen in order to investigate the possible collisions of the second kind and thus determine the mechanisms responsible for the radiation. Several possible mechanisms are proposed in the report, but complete explanation must await further studey. (Author)

AD-640 708 Field 20I
CFSTI Prices: HC$1.00 MF$0.50
Texas Univ., Austin. Plasma Physics Lab.
ANOMALOUS TRANSPORT PHENOMENA IN A RING DISCHARGE.
Technical rept.,
by Erick Lindman, Hans Schluter, and C. J. Ransom. 1966, 9p
AROD-6398:2

Descriptors: (*Transport properties, *Plasma physics), Electric discharges, Radiofrequency, Theory.

AD-640 728 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
HIGH TEMPERATURE STABILIZED ELECTRIC ARCS OF HIGH POWER (ELECTRIC ARC PLASMOTRONS),
by V. B. Tikhonov, and E. A. Yakovlev. 12 Jul 66, 40p FTD-TT-65-1405
TT-66-62499
Unedited rough draft trans. of Aviatsionnyi Institut, Moscow, Trudy (USSR), v119 p43-71 1960.

Descriptors: (*Plasma jets, *Electric arcs), High-temperature research, Stability, Power, USSR.

In order to stabilize the arc channel in plasmotrons one may use either water or other liquids, or even various gases (hydrogen, nitrogen, argon, atmospheric air and the like). If electric-arc plasmotrons are used in practice, in technical or physical investigations, the problem of determining such plasma parameters as composition, temperature, velocity, etc., is of particularly great importance. The solution of such problems is linked with several serious difficulties of both methodical and technical nature. (Author)

AD-640 775 **Field 20I, 20N**
Not available from CFSTI.
General Dynamics, Fort Worth, Tex.
MAGNETOPLASMA WAVEGUIDE WITH VISCOSITY AND HEAT CONDUCTION,
by Bernard A. Sodek Jr. 23 Apr 65, 18p
Contract AF 49 (638)-1428
Proj. AF-9768
Task 976801
AFOSR-66-1081
Availability: Published in Plasma Physics-Accelerators-Thermonuclear Research Journal of Nuclear Energy PtC v7 p547-61.

Descriptors: (*Waveguides, *Magnetohydrodynamics), Viscosity, Thermal conductivity, Plasma physics, Ionospheric propagation.

A two-fluid analysis of the modes of propagation in a magnetoplasma-filled waveguide may be based upon the solution of a pair of coupled partial differential equations for the longitudinal components of the hydromagneic wave. A method of solving these equations, which involves a system of transcendental equations for a set of undetermined parameters, is indicated. Approximate solutions are obtained with pressure, resistivity, viscosity, heat conduction, and current inertia treated exactly, while neglecting certain effects, such as the Hall effect, which are generally small at hydromagnetic frequencies. The effects of viscosity and heat conduction on the dispersion relations are shown explicitly. (Author)

AD-640 816 **Field 20I, 20D**
CFSTI Prices: HC$5.00 MF$1.00
Ohio State Univ., Columbus.
INVISCID NON-EQUILIBRIUM FLOW OF AN EXPANDED AIR PLASMA. ABSTRACT OF DISSERTATION.
Doctoral thesis,
by Stuart Lee Petrie. 1964, 156p
Contracts AF 33 (657)-7561, AF 33 (657)-11060

Descriptors: (*Plasma medium, Air), (*Magnetohydrodynamics, Nonequilibrium flow), Wind tunnels, Chemical reactions, Nitrogen, Vibration, Electron beams, Abstracts.

It was shown that a high degree of chemical and vibrational non-equilibrium can exist in the expanded flow from an arc-heated wind tunnel. The experimental studies substantiate the existence of an effective flow freezing point for the chemical reactions. The measured nitrogen vibrational temperatures were found to be significantly lower than predicted by the application of shock tube excitation times in a Landau-Teller relaxation calculation. The low vibrational temperatures measured in the experimental studies suggest that the effects of vibrational freezing on the properties of the wind tunnel test gas may not be as severe as anticipated. The experimental studies demonstrate that the thermochemical state of the effluent generated by the arc-heated wind tunnel can be defined reasonably well. (Author)

AD-641 083 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Berkeley. Electronics esearch Lab.
PLASMA RESEARCH.
Quarterly progress rept. no. 3, 1 Jul-30 Sep 65,
by C. K. Birdsall, A. J. Lichtenberg, and A. W. Trivelpiece. 30 Sep 65, 44p
Contract AF 33 (615)-1078, Grant AF-AFOSR-139-65
Proj. AF-4751
AFOSR-66-2365
Grant NSF-GA-2239, Contract AT (11-1)-34, see also AD-625 424.

Descriptors: (*Plasma physics, Scientific research), High-temperature research, Low-temperature research, Cyclotrons, Electron beams, Electromagnetic waves, Synchrotrons, Reviews.

Progress is reported on experimental and theoretical research in problems of creation, containment, heating, stability, radiation, and measurement of the physical and electromagnetic properties of high and low temperature plasmas. The hot-electron experiment operated without difficulty during most of the report period. Most of the effort was concerned with obtaining adequate data to determine the absolute intensity of the synchrotron radiation emitted by the hot-electron plasma. The electron and loss energy analyzer was completed, and the electron end-loss plasma camera used in conjunction with an image converter was used to improve the estimates of the size and location of the plasma. The inconclusive results of the laser-scattering experiments have led to a study of the scattering of laser photons by a hot-electron plasma. A turbulent heating experiment was performed in order to study ion heating by an electron current modulated at the ion-cyclotron frequency. Calibration of the ion energy analyzer is proceeding. A description of the turbulent heating experiment is presented. The experimental apparatus for plama instability experiments is being prepared. An analysis of flute modes in a mirror machine plasma with diffused boundary was completed. Related research includes the testing of a computer model for nonlinear investigation of plasma interchange instability, investigation of the damping and instabilities of cyclotron waves in a plasma, and the study of nonlinear interaction of an electron with an electromagnetic wave. (Author)

AD-641 088 **Field 20I**
CFSTI Prices: HC$4.00 MF$1.00
Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.
PRECURSOR RADIATION IN ELECTROMAGNETIC SHOCK TUBES.
Technical rept.,
by Michael J. Scotto, and Donald E. Kerr. Sep 66, 132p TR-4
Contract Nonr-4010 (10)
Proj. NR-012-304

Descriptors: (*Electromagnetic waves, Shock tubes), (*Plasma medium, Thermal properties), Spectroscopy, Microwaves, Energy, Gases.

The purpose of the investigation was to determine the origin and magnitude of pre-excitation in a shock tube with a cylindrical geometry, and to determine whether a sufficient amount of energy is transferred to the cold gas to account for the observed discrepancies. Pre-excitation of the cold gas ahead of the main luminosity front was examined through spectroscopic analysis of optical precursor radiation and microwave measurements of the electron density. The populations of radiative excited states in a helium filled shock tube were determined from absolute intensity measurements of the precursor radiation. Estimates of the populations of metastable states were obtained from optical absorption measurements, and from measurements of optical radiation arising from a resonant transfer of excitation to an impurity gas. By measuring the spatial decrease of optical precursor light along the observation tube, it was possible to establish a model of pre-excitation in which energy is transferred to the cold gas through the absorption of ultra-violet radiation emitted from the discharge chamber. The production of optical precursor light is found to be consistent with a two-step process consisting of photo-ionization of the cold gas followed by excitation by electron impact. The results of the measurements also provided an upper limit to the populations of excited states. These results showed that only a small fraction of the cold gas is pre-excited. (Author)

AD-641 093 **Field 20I**
Not available from CFSTI.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
ANOMALOUS PROPAGATION IN A QUANTUM PLASMA AND MAGNON-HELICON COUPLING,
by A. J. Glick, E. Callen, and G. Heiche. 22 Feb 66, 5p
Grant AF-AFOSR-735-65
Proj. AF-9761
Task 976101
AFOSR-66-1239
Prepared in cooperation with Osaka Univ. (Japan) Dept. of Physics, and Naval Ordnance Lab., White Oak, Md.
Availability: Published in Physics Letters v20 n6 p574-6 Apr 1 1966.

Descriptors: (*Plasma medium, Propagation), (*Cyclotron resonance phenomena, Propagation), Electromagnetic waves, Ferromagnetic materials, Japan.

A study of whether quantum effects make it possible for electromagnetic modes or coupled electromagnetic-spin wave modes to propagate in normal or ferromagnetic metals for frequencies and wave numbers well within the semiclassical 'Doppler shifted cyclotron resonance' absorption region. (Author)

AD-641 145 **Field 20I, 20M**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ABSORPTION AND EMISSION COEFFICIENT DETERMINATION BY A ZONAL RING TECHNIQUE IN A CIRCULAR CYLINDRICAL PLASMA COLUMN.
Scientific rept.,
by John P. Oss. Jun 66, 67p ARL-66-0110
Proj. 7073-00-01

Descriptors: (*Plasma medium, Temperature), Data processing systems, Programming (Computers), Thermal radiation, Absorption, Integral equations.

Identifiers: Plasma diagnostics.

An automated data acquisition and reduction system is described for obtaining absorption and emission coefficients in a circular cylindrical plasma column. The data reduction is based on a zonal ring method with the absorption coefficient accounted for in the emission coefficient calculations. Computer programs are included. (Author)

N66-30076 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
OPTIMIZATION OF ADIABATIC MAGNETIC MIRROR FIELDS FOR CONTROLLED FUSION RESEARCH.
by J. R. Roth. Jul 66, 43p NASA-TM-X-1251

Descriptors: *Controlled fusion, *Cost estimate, *Magnetic mirror, *Optimization, *Plasma confinement, Adiabat, Apparatus, Coil, Confinement, Control, Cost, Design, Dimension, Estimate, Field, Fusion, Ion, Magnetic, Mirror, Particle, Plasma, Ratio, Research, Strength.

For abstract, see STAR 04 17.

N66-30183 **Field 20I**
CFSTI Prices HC$3.00 MF$0.75
General Dynamics/astronautics, San Diego, Calif.
ELECTRODE PHENOMENA IN HIGH ENERGY DENSITY DISCHARGES AS APPLIED TO PLASMA ACCELERATION PROBLEMS.

by H. Poppa. Jul 66, 61p NASA-CR-506
Contract NASW-1103

Descriptors: *Electrode, *Morphology, *Plasma acceleration, Acceleration, Cathode, Copper, Density, Diffraction, Discharge, Electron, Energy, Foil, Gold, Gun, High energy, Interaction, Ion, Microscopy, Nitrogen, Plasma, Sputtering, Structure, Surface, Thin, Transmission.

For abstract, see STAR 04 17.

N66-30184 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
Mithras, Inc., Cambridge, Mass.
ELECTRON ATTACHMENT TO ATOMIC FLUORINE IN THERMALLY IONIZED AIR.
by R. E. Good. Jul 66, 50p NASA-CR-516
Contracts NASW-601, NASW-941

Descriptors: *Electron attachment, *Fluorine, *Radio blackout, *Reentry communication, Air, Atmospheric, Atom, Attachment, Blackout, Communication, Electron, Gas, Interferometer, Ionization, Microwave, Nozzle, Plasma, Radio, Reentry, Shock, Thermal, Tube, Wedge.

For abstract, see STAR 04 17.

N66-30292 **Field 20I**
CFSTI Prices HC$6.00 MF$1.25
National Aeronautics And Space Administration, Washington, D. C.
PROBLEMS OF PLASMA THEORY.
Apr 65, 223p NASA-TT-F-9274
Transl. Into English Of Vopr. Teorii Plazmy (Moscow), No. 4, 1964 P 1-187

Descriptors: *Collisionless plasma, *Coulomb collision, *Hydrodynamic equation, *Plasma-particle interaction, *Rarefied plasma, *Shock wave, Collective, Collision, Collisionless, Equation, Hydrodynamics, Interaction, Ionized, Kinetic, Pair, Physics, Plasma, Process, Rare, Shock, Wave.

For abstract, see STAR 04 17.

N66-30304 **Field 20I**
CFSTI Prices HC$3.00 MF$0.75
National Bureau Of Standards, Boulder, Colo. Cryogenics Div.
QUALITY DETERMINATION OF LIQUID-SOLID HYDROGEN MIXTURES.
by D. E. Daney, and D. B. Mann. 21 Mar 66, 71p NASA-CR-76137, NBS-9189
NASA ORDER W-12165

Descriptors: *Hydrogen, *Liquid-solid interface, *Qualitative analysis, *Vaporization, Analysis, Flow, Fraction, Freeze, Heat, Interface, Leakage, Liquid, Mass, Meter, Method, Mixture, Point, Process, Quality, Solid, Thaw, Triple.

For abstract, see STAR 04 17.

N66-30330 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md. Princeton Univ., N. J.
THE CONTRIBUTION OF ELECTRON-ELECTRON COLLISIONS TO THE EMISSION OF BREMSSTRAHLUNG BY A PLASMA.
by T. J. Birmingham, J. M. Dawson, and R. M. Kulsrud. Mar 66, 46p NASA-TM-X-55507, X-641-66-89
Contracts AT/30-1/-1238, NSF GP-579
Submitted For Publication Prepared Jointly With Princeton Univ.

Descriptors: *Bremsstrahlung, *Electron collision, *Mathematical model, *Plasma radiation, *Radiation emission, Collision, Electron, Emission, Frequency, Harmonic, Ion, Longitudinal, Mathematics, Model, Plasma, Radiation, Resonance, Spectrum, Transverse, Wave.

For abstract, see STAR 04 17.

N66-30595 **Field 20I**
CFSTI Prices HC$5.00 MF$1.00
Stanford Univ., Calif. Dept. Of Aeronautics And Astronautics.
ANALYSIS OF BOUNDARY LAYER STRUCTURE IN A SHOCK-GENERATED PLASMA FW. PART 1 - EQUILIBRIUM IONIZATION.
by S. Knoos. May 66, 170p NASA-CR-76247, SUDAAR-277
Contract NGR-05-020-091
Its Rept.-80

Descriptors: *Argon plasma, *Laminar boundary layer, *Shock heating, Analysis, Argon, Boundary, Convection, Electric, Electron, Equilibrium, Flow, Gas, Heating, High density, Ionization, Ionized, Laminar, Layer, Linear, Model, Plasma, Property, Shock, Structure, Temperature, Thermochemistry, Thermodynamic, Transport, Tube.

For abstract, see STAR 04 17.

N66-30609 **Field 20I**
CFSTI Prices HC$4.00 MF$0.75
Stanford Univ., Calif. Dept. Of Aeronautics And Astronautics.
RADIATIVE BEHAVIOR OF SHOCK HEATED ARGON PLASMA FLOWS.
by K. P. Horn. May 66, 120p NASA-CR-76237, SUDAAR-268
Contract NGR-05-020-091
Its Inst. Of Plasma Res. Rept.-79

Descriptors: *Argon plasma, *Ionized gas, *Radiation emission, *Shock heating, Argon, Decrease, Degree, Density, Electron, Emission, Equilibrium, Gas, Heating, Interferometry, Ionized, Line, Mass, Mirror, Optical, Plasma, Radiation, Rotation, Shock, Spectrum, Thermodynamic, Transition.

For abstract, see STAR 04 17.

N66-30871 **Field 20I**
CFSTI Prices HC$3.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge.
INFLUENCE OF COMPRESSIBILITY ON CONDUCTION- TYPE AC MHD GENERATORS.
by P. Ponthus. Apr 66, 53p NASA-CR-76376, ESRO-SN-4
Sponsored By Nasa And Esro

Descriptors: *Alternating current generator, *Compressibility effect, *Magnetohydrodynamic generator, Alternating, Calculation, Compressibility, Compressible, Conduction, Conversion, Current, Effect, Energy, Equation, Fluid, Generator, Ionized, Model, Numerical, Perturbation, Power, Source, Velocity.

For abstract, see STAR 04 17.

N66-31326 **Field 20I**
CFSTI Prices HC$3.00 MF$0.75
Toronto Univ. (Ontario). Inst. For Aerospace Studies.
REPORT ON THE FOURTH INTERNATIONAL SYMPOSIUM ON RAREFIED GAS DYNAMICS.
by G. N. Patterson. 1964, 67p NASA-CR-76458, AD-632897
Contract NONR/G/-00068-64
Symp. Held At Toronto, Canada, 14-17 Jul. 1964, Sponsored By Af Office Of Sciences, And Nasa

Descriptors: *Conference, *Molecular beam, *Plasma flow, *Rarefied gas dynamics, *Shock wave, *Surface interaction, Apparatus, Beam, Dynamics, Flow, Gas, Interaction, Internal, Kinetic, Molecular, Plasma, Rarefaction, Shock, Structure, Surface, Technique, Theory, Transition, Wave.

For abstract, see STAR 04 17.

N66-31353 **Field 20I**
CFSTI Prices HC$1.0 MF$0.50
National Aeronautics And Space Administration, Lewis Research Center, Cleveland, Ohio.
FLOW OF ELECTRONS THROUGH A RAREFIED GAS BETWEEN PLANE PARALLEL ELECTRODES.
by P. M. Sockol. Jul 66, 20p NASA-TN-D-3510

Descriptors: *Electrode, *Free electron, *Particle motion, *Rarefied gas, Boltzmann equation, Charge, Current, Density, Electron, Equation, Flow, Free, Gas, Integral, Lorentz gas, Model, Motion, Parallel, Particle, Path, Plane, Poisson equation, Rare, Voltage.

For abstract, see STAR 04 17.

N66-31928 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
Union Carbide Corp., Bound Brook, N. J. Polymer Research And Development Dept.
SATURATED HYDROCARBON POLYMERIC BINDER FOR ADVANCED SOLID PROPELLANT AND HYBRID SOLID GRAINS QUARTERLY REPORT NO. 2, 1 FEB. - 30 APR. 1966.
by A. C. Ashcraft Jr, J. E. Potts, E. M. Sullivan, and E. W. Wise. 1966, 23p NASA-CR-76476
Contracts NAS7-100, JPL-951210
Prepared For Jpl

Descriptors: *Ethylene compound, *Free radical, *Polymer chemistry, *Propellant binder, Analysis, Binder, Chemistry, Compound, Ethylene, Free, Grain, Hexene, Hybrid, Hydrocarbon, Imine, Ketene, Polymer, Propellant, Radical, Saturation, Synthesis.

For abstract, see STAR 04 17.

N66-32129 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
Yale Univ. Observatory, New Haven, Conn.
RELATIVISTIC BREMSSTRAHLUNG IN A PLASMA.
by S. P. And. 1965, 32p NASA-CR-76633
Grant NSG-176

Descriptors: *Bremsstrahlung, *Plasma, *Relativistic particle, Electric, Emission, Field, Fluid, Hydrodynamics, Magnetic, Particle, Radiation, Relative, Resonance, Subsonic, Supersonic.

For abstract, see STAR 04 17.

N66-32303 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
Yale Univ. Observatory, New Haven, Conn.
PLASMA RESONANCE RADIATION.
by M. D. Altschuler. 1965, 32p NASA-CR-76663
Grant NSG-176

Descriptors: *Charged particle, *Corona, *Plasma resonance, *Solar radiation, Charge, Cloud, Electromagnetic, Emission, Excitation, Field, Motion, Nonthermal, Oscillation, Particle, Plasma, Quality, Radiation, Radio Resonance, Solar, Test.

For abstract, see STAR 04 17.

N66-32304 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
Yale Univ. Observatory, New Haven, Conn.
PLASMA RESONANCE RADIATION AND TYPE III BURSTS.
by L. Oster. 1966, 18p NASA-CR-76661
Grant NSG-176

Descriptors: *Corona, *Hydrodynamic equation, *Plasma resonance, Electron, Emission,

Equation, Frequency, Harmonic, Hydrodynamics, Pattern, Photosphere, Plasma, Radiation, Resonance, Type iii burst.

For abstract, see STAR 04 17.

N66-32639 Field 20I
CFSTI Prices HC$1.00 MF$0.50
California Univ., Los Angeles. Inst. Of Geophysics And Planetary Physics.
EVIDENCE FOR HYDROMATIC WAVES IN THE INTERPLANETARY PLASMA.
by P. J. Coleman Jr. 20 Apr 66, 24p NASA-CR-76945
Grant NSG-249
Its Publ.-497

Descriptors: *Interplanetary space, *Magnetohydrodynamic wave, *Mariner ii space probe, *Plasma probe, Cross, Field, Frequency, Interplanetary, Magnetic, Magnetohydrodynamic, Plasma, Probe, Space, Spectrum, Velocity, Wave.

For abstract, see STAR 04 17.

N66-36849 Field 20I
CFSTI Prices HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
STUDY OF THE EFFECTS OF A PLASMA IN THE NEAR-ZONE FIELD OF AN ANTENNA.
by W. C. Taylor. Sep 66, 40p NASA-CR-611
Contract NAS1-4973

Descriptors: *Antenna field, *Plasma sheath, Antenna, Coefficient, Density, Electron, Field, Ground, Near, Physics, Plane, Plasma, Reentry, Reflection, Sheath, Shock, Tube, X-band, Zone.

For abstract, see STAR 04 22.

N66-37206 Field 20I
CFSTI Prices HC$5.00 MF$1.00
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
NUMERICAL STUDIES OF THE NON-LINEAR VLASOV EQUATION.
by T. P. Armstrong. Aug 66, 155p NASA-CR-78021
Grant NSG-233-62
Its Rept.-66-34

Descriptors: *Initial value problem, *Nonlinear equation, *Numerical integration, *Vlasov equation, Collisionless, Dimensional, Electron, Equation, Gas, Initial, Integration, Landau damping, Nonlinear, Numerical, One, Plasma, Problem, Theory, Value.

For abstract, see STAR 04 22.

N66-37298 Field 20I
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
STUDY OF COAXIAL HALL CURRENT ACCELERATORS AT MODERATE PRESSURES.
by W. Grossmann Jr, H. A. Hassan, and R. V. Hess. Oct 66, 36p NASA-TN-D-3286
Contract 129-01-05-04-23

Descriptors: *Coaxial accelerator, *Hall accelerator, Accelerator, Coaxial, Electron, Field, Flow, Hall current, Ion, Ionization, Magnetic, Mass, Plasma, Pressure, Rate, Temperature, Voltage.

For abstract, see STAR 04 22.

N66-37319 Field 20I
CFSTI Prices HC$2.00 MF$0.50
Maryland Univ., College Park.
CORRECTIONS TO THE ASYMPTOTIC HOLTSMARK FORMULA FOR HYDROGEN LINES BROADENED BY ELECTRONS AND IONS IN A PLASMA.
by H. R. Griem. 1966, 26p NASA-CR-78198
Contract NGR-21-002-073

Descriptors: *Hydrogen, *Line spectrum, *Stark effect, Approximation, Asymptote, Broadening, Correction, Dipole, Electron, Element, Formula, Impact, Interaction, Ion, Matrix, Monopole, Plasma, Quasi-static.

For abstract, see STAR 04 22.

N66-37375 Field 20I
CFSTI Prices HC$2.00 MF$0.50
Stanford Univ., Calif. Inst. For Plasma Research.
THE PLASMA CAPACITOR IN A MAGNETIC FIELD.
by F. W. Crawford, T. D. Mantei, and J. A. Tataronis. Apr 66, 27p NASA-CR-78164, SU-IPR-64
Contracts NGR-05-020-077, NSF GK-617

Descriptors: *Capacitor, *Computation, *Magnetic field, *Parallel plate, *Plasma, Coaxial, Cyclotron, Cylinder, Density, Electron, Frequency, Harmonic, Impedance, Resonance.

For abstract, see STAR 04 22.

N66-37527 Field 20I
CFSTI Prices HC$3.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile And Space Div.
TRANSPORT PROPERTIES OF PARTIALLY IONIZED NITROGEN. II - METHOD AND RESULTS.
by M. P. Sherman. Aug 65, 53p NASA-CR-78376, R65SD44
Contract NASR-32

Descriptors: *Ionized gas, *Nitrogen *Transport property, Calculation, Conductivity, Diffusion, High temperature, Method, Partial, Plasma, Thermal, Viscosity.

For abstract, see STAR 04 22.

N66-37528 Field 20I
CFSTI Prices HC$3.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile And Space Div.
TRANSPORT PROPERTIES OF PARTIALLY IONIZED NITROGEN. I - THE COLLISION INTEGRALS.
by M. P. Sherman. Jul 65, 54p NASA-CR-78375, R65SD43
Contract NASR-32

Descriptors: *Ionized gas, *Nitrogen, *Particle collision, Cross, Dynamics, High temperature, Integral, Partial, Plasma, Section.

For abstract, see STAR 04 22.

PB-173 185 Field 20I, 18A
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
DISSOCIATION VIBRATIONNELLE ET DISSOCIATION EN CASCADE D'IONS H2(+) PAR COLLISIONS AVEC LES MOLECULES D'UN GAZ (Vibrational and Cascade Dissociation of H2 (+) Ions by Collision with Gas Molecules),
by Philippe Verveer. Jul 66, 62p CEA-R-2983
Text in French; Attached Summary in English.

Descriptors: (*Hydrogen, *Dissociation), (*Plasma medium, Hydrogen), Protons, Gas ionization, Argon, Probability, France.

Protons produced by collisional dissociation of H2 (+) ions have an energy spectrum with a narrow central peak. For a part the protons in this peak are produced by vibrational dissociation and for another part by a cascade of two collisions. For H2 (+) ions of 50 to 150 keV the cross section for vibrational dissociation is about 4.1 x 10 to the -19th power sq. cm/mol. in hydrogen and 1.1 x 10 to the -18th power sq. cm/mol. in argon. (Author)

PB-173 195 Field 20I
CFSTI Prices: HC$4.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
EXCITATION SIMULTANEE DES RESONANCES ELECTRONIQUE ET IONIQUE DANS UN PLASMA DANS UN CHAMP MAGNETIQUE STATIQUE, PRODUITE PAR UN CHAMP ELECTROMAGNETIQUE H.F. MODULE A UNE BASSE FREQUENCE (Simultaneous Excitement of Electron and Ion Resonances in a Magnetoplasma by a High Frequency Electromagnetic Field Low Frequency Modulated),
by Enrico Zilli. Jul 66, 47p CEA-R-3053
Text in French; Attached Summary in English.

Descriptors: (*Plasma medium, *Cyclotron resonance phenomena), Electrons, Ions, Resonance, Excitation, Electromagnetic fields, Modulation, Theory, Waveguides, Gas discharges, France.

A single-particle, collisionless, non-relativistic theory is proposed, in which the possibility is shown of exciting electron and ion resonances in a magnetoplasma, by means of a high frequency electromagnetic field, whose amplitude is low frequency modulated. Two solutions of this problem are given. The first one rests on the possibility of exciting the ion cyclotron resonance taking into account the low frequency electromagnetic field low frequency modulated. In the second solution the possibility of exciting the electron and ion resonances is considered in an electromagnetic field, whose magnetic component parallel is low frequency modulated. The results are discussed in the field of a cylindrical wave guide driven in the TE01-mode. (Author)

PB-173 238 Field 20I
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
ONDES DANS LES PLASMAS INHOMOGENES EN GEOMETRIE CYLINDRIQUE (Waves in Inhomogeneous Plasma of Cylindrical Geometry).
Doctoral thesis,
by Paul-Henri Rebut. 14 Jan 66, 69p CEA-R-2960
Text in French; Attached summary in English.

Descriptors: (*Plasma medium, Conductivity), Equations, Perturbation theory, Stability, Electric fields, Heat, Absorption, France.

The conductivity tensor of a hot and inhomogeneous plasma was calculated for a cylindrical geometry using Vlasov's equations. The method used consists in a perturbation method involving the first integrals of the unperturbed movement. The conductivity tensor will be particularly useful for dealing with stability problems. In the case of a cold plasma the wave equation giving the electric fields as a function of the radius is obtained. This equation shows the existence of resonant layers which lead to an absorption analogous to the Landau absorption in a hot plasma. (Author)

AD-294 465 See Field 17I

AD-479 463 See Field 7D

AD-640 630 See Field 7D

AD-640 705 See Field 7D

AD-641 123 See Field 20D

AD-641 225 See Field 20D

ORNL-3989 See Field 18A

PB-173 183 See Field 14B

PB-173 187 See Field 18A

20J. QUANTUM THEORY

AD-640 662 **Field 20J, 2H**
Not available from CFSTI.
Maryland Univ., College Park.
VALIDITY OF MANY-BODY APPROXIMATION METHODS FOR A SOLVABLE MODEL. II. LINEARIZATION PROCEDURES,
by N. Meshkov, A. Glick, and H. J. Lipkin. 18 Feb 64, 15p
Grant AF-AFOSR-62-46
Proj. AF-9761
Task 976101
AFOSR-66-1287
Prepared in cooperation with Weismann Inst. of Science, Rehovoth (Israel). See also AD-616 057.
Availability: Published in Nuclear Physics v62 p199-209 1965.

Descriptors: (*N-body problem, *Fermions), (*Approximation (Mathematics), Equations of motion), Nuclear models, Perturbation theory, Model theory, Quantum mechanics.

The validity of methods used in the study of many-particle systems is investigated by using the same approximation in treating a simple model for which exact solutions are available. The model consists of N fermions distributed in two N-fold degenerate levels and interacting via a monopole-monopole force. The excitation energy of the first collective state above the ground state is calculated using the following methods: (i) the method of linearized equations of motion, (ii) linearization with the inclusion of renormalized single-particle energies, (iii) a new self-consistent linearization method. The results of these approximation methods are then compared with exact results and with the results of ordinary perturbation theory found in a previous paper. It is found that renormalization of the single-particle energies leads to a considerable improvement of the results over that obtained with the ordinary linearization method, especially for small numbers of particles. Further improvement is obtained with the self-consistent linearization method. The possibility of applying the latter method to more realistic problems is briefly discussed. (Author)

AD-640 688 **Field 20J**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
EFFECT OF A COORDINATE MEASUREMENT ON THE STATISTICAL ENSEMBLE OF A QUANTUM MECHANICAL SYSTEM,
by A. E. Glassgold, and Dennis Holliday. Oct 66, 28p RM-5138-PR
Contract AF 49 (638)-1700

Descriptors: (*Quantum mechanics, Measurement), Statistical processes, Statistical functions.

A method is developed for discussing the measurement of quantum mechanical observables with continuous eigenvalue spectra. In this method, the Wigner distribution function has a role similar to that of the Gibbs phase space density in the corresponding classical problem. The analysis applies to a wide class of physical situations, such as a field or a material particle. (Author)

AD-640 817 **Field 20J, 20H**
Not available from CFSTI.
Maryland Univ., College Park.
VALIDITY OF MANY-BODY APPROXIMATION METHODS FOR A SOLVABLE MODEL. (III). DIAGRAM SUMMATIONS.
Interim rept.,
by A. J. Glick, N. Meshkov, and H. J. Lipkin. 18 Feb 64, 16p
Grant AF-AFOSR-62-46
Proj. AF-9761
Task 976101
AFOSR-65-0777
Prepared in cooperation with Weizmann Inst. of Science, Rehovoth (Israel).
Availability: Published in Nuclear Physics v62 p211-24 1965.

Descriptors: (*N-body problem, *Fermions), (*Perturbation theory, N-body problem), Nuclear models, Quantum mechanics, Energy, Excitation.

The model N-fermion system studied in two previous papers is reconsidered in order to investigate the range of validity of diagrammatic many-body perturbation theory and various selective summations of higher order graphs. The familiar random phase approximation or bubble graph sum is shown to be the first term in an expansion in powers of 1/N for which the coefficients are arbitrary functions of NV/e, where V is the interaction strength and e is the level separation of the non-interacting system. However, the 1/N expansion converges very slowly (if at all) for $N < 40$. Other corrections to the bubble sum which do not fit into such an expansion are shown to be much more important than the 1/N corrections for small N. These are the exchange and self-energy graphs which correct for counting errors and violations of the exclusion principle when enumerating the states that a given particle can occupy. With these terms a rather good approximation to the excitation energy can be obtained, though the results are not quite as good as that obtained with fourth-order perturbation theory for small N, or for the whole range of N with the self-consistent linearization procedure described in a previous paper. (Author)

AD-640 854 **Field 20J**
Not available from CFSTI.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
LEADING LANDAU CURVES OF A CLASS OF FEYNMAN DIAGRAMS,
by Jamal N. Islam. 1 Jun 65, 11p
Grant AF-AFOSR-500-66
Proj. AF-9751
Task 975101
AFOSR-66-1404
Availability: Published in Journal of Mathematical Physics v7 n4 p652-60 Apr 1966.

Descriptors: (*Algebraic geometry, *Quantum mechanics), (*Perturbation theory, Quantum mechanics), Momentum.

Identifiers: Landau curves, Feynman diagrams.

In a previous paper it was shown that the leading Landau curves of some Feynman diagrams do not give singularities on the physical sheet if some of the internal and external masses satisfy certain simple inequalities. In the present paper it is shown that a similar property is satisfied by a class of Feynman diagrams. The inequalities involve a fixed number of masses for the whole class. (Author)

AD-640 935 **Field 20J, 20C**
Not available from CFSTI.
Southwest Center for Advanced Studies, Dallas, Tex.
ONDES GRAVITATIONNELLES EN PRESENCE D'UN CHAMP ELECTROMAGNETIQUE. II (Gravitational Waves in the Presence of an Electromagnetic Field),
by M. Cahen, and J. Leroy. 1965, 9p
Grants AF-AFOSR-903-65, NsG-269-62
Proj. AF-9767
Task 976704
AFOSR-66-1403
Availability: Published in Bulletin de l'Academie Royale de Belgique (Classe des Sciences)Ser4 p966-1016 Oct 1965.

Descriptors: (*Gravity, *Electromagnetic fields), Relativity theory, Field theory, Propagation, Differential equations.

Identifiers: Gravitational radiation.

The authors find all solutions of Einstein Maxwell equations of Petrov type N in the case of a null electromagnetic field. Certain limiting cases are studied. (Author)

AD-640 936 **Field 20J**
Not available from CFSTI.
Southwest Center for Advanced Studies, Dallas, Tex.
ELLIPTIC KRUSKAL-SCHWARZSCHILD SPACE,
by W. Rindler. 14 Oct 65, 3p
Grant AF-AFOSR-903-65
Proj. AF-9751
Task 975103
AFOSR-66-0822
Availability: Published in Physical Review Letters v15 n26 p1001-2 Dec 27 1965.

Descriptors: (*Relativity theory, Differential geometry).

Identifiers: Kruskal-Schwarzschild space.

AD-641 006 **Field 20J, 20H**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
REDUCTION OF THE ELECTROMAGNETIC VECTOR POTENTIAL TO THE IRREDUCIBLE REPRESENTATIONS OF THE INHOMOGENEOUS LORENTZ GROUP AND MANIFESTLY COVARIANT QUANTIZATION WITH A POSITIVE-DEFINITE METRIC FOR THE HILBERT SPACE,
by Harry E. Moses. 25 Sep 65, 26p JA-2594A
Contracts AF 19 (628)-5167, ARPA order-512
ESD-TR-66-372
Availability: Published in Il Nuovo Cimento v42 (S10) p757-81 Apr 21 1966.

Descriptors: (*Wave functions, *Photons), (*Field theory, Wave functions), Potential theory, Groups (Mathematics), Functional analysis.

In the present paper the author expands the vector potential into modes, the amplitudes of which are wave functions for massless particles of spin 0 and 1 in Wigner's classification of particles according to the irreducible representations of the inhomogeneous Lorentz group. It is shown that only the spin-1 wave functions contribute to the electromagnetic fields and that they represent circularly polarized electromagnetic waves. On replacing the wave functions by operators, one obtains a manifestly covariant quantization of the vector potential acting on a Hilbert space in which the norm of the Hilbert space and the energy are positive-definite. Unlike the treatments of Fermi and Bleuler and Gupta where the Lorentz condition is required to be satisfied in a subspace of the Hilbert space in order to obtain positive-definite energies and norms, in the present treatment the Lorentz condition is satisfied identically over the entire Hilbert space. Indeed, our quantization procedure resembles that used for the Dirac electron field and has no more difficulties. It is also shown that the new method of quantization does not change in any way the Feynman-Dyson-Wick calculations for the matrix elements of the scattering operator, except that the photon wave functions are now explicit instead of implicit as in earlier treatments. (Author)

AD-641 033 **Field 20J, 20H**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Physics.
THEORY AND CALCULATION OF SCATTERING WITH THE BETHE-SALPETER EQUATION.
Revised ed.,
by Charles Schwartz, and Charles Zemach. 2 Oct 65, 16p
Grant AF-AFOSR-130-65
Proj. AF-9767
Task 976701
AFOSR-66-1598

Revised edition of manuscript received 23 Jun 65.
Availability: Published in Physical Review v141 n4 p1454-67 Jan 1966.

Descriptors: (*Elementary particles, Nuclear scattering), (*Nuclear scattering, Equations of motion), Relativity theory, Wave functions, Integrals, Green's function, Phase shift, Operators (Mathematics).

Identifiers: Bethe-Salpeter equation.

The Bethe-Salpeter equation describes the interaction of two scalar particles vie the exchange of a third scalar particle in the ladder approximation. The properties of the Green's function and the potential in coordinate space are shown to permit a Wick rotation to an imaginary time variable, without appeal to information not contained in the original equation. The resulting four-dimensional (Euclidean) wave equation has a solution which grows exponentially for large time-like distances but behaves as an ordinary Schrodinger scattering wave for large space-like distances. A modification of the Schwinger variational principle is used to obtain, with a modest use of computing machinery, scattering phase shifts for various angular momenta and for energies below the inelastic threshold. The success of these calculations indicates that the Bethe-Salpeter equation can be accepted as a powerful and practical tool for the study of strong-interaction dynamics. (Author)

AD-641 035 **Field 20J, 20H**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Physics.
APPLICATION OF THE SCHWINGER VARIATIONAL PRINCIPLE FOR SCATTERING.
Revised ed.,
by Charles Schwartz. 2 Oct 65, 3p
Grant AF-AFOSR-130-65
AFOSR-66-1708
Revision of manuscript received 23 Jun 65.
Availability: Published in Physical Review v141 n4 p1468-70 Jan 1966.

Descriptors: (*Nuclear scattering, *Wave functions), Potential theory, Field theory, Integral transforms, Green's function, Integral equations, Calculus of variations.

Identifiers: Schwinger variational method, Yukawa potentials.

The usual difficulty of having to evaluate double intergrals with G (x,x') is avoided by considering as the trial function U (x)=VCx)psi (x) and its Fourier transform. Numerical calculations of s-wave scattering by a Yukawa potential were carried out both by means of this form of Schwinger's method and also by using Kohn's variational principle. For comparable trial functions, the latter method appears to converge faster. (Author)

AD-641 051 **Field 20J, 20H**
Not available from CFSTI.
Institute for Advanced Studies, Princeton, N. J.
MASS DIFFERENCES, CHARGES, AND MAGNETIC MOMENTS IN SU (3) BOOTSTRAP THEORY,
by Yasuo Hara. 22 Nov 65, 11p
Grant AF-AFOSR-42-65
Proj. AF-9751
Task 975101
AFOSR-66-1246
Availability: Published in Physical Review v144 n4 p1241-9 Apr 29 1966.

Descriptors: (*Baryons, Groups (Mathematics)), Field theory, Magnetic moments, Elastic scattering, Theory, Nuclear resonance

Identifiers: Symmetry (Quantum mechanics), Bootstrap hypothesis.

Bootstrap theory is applied to the mass differences, the charges, and the magnetic moments of baryons on the following assumptions: (1) that the baryon octet and the baryon decuplet are bound states of the baryon octed and the pseudoscalar meson octed, (2) the tadpole model of mass differences and the vector-meson dominance model of electromagnetic form factors, and (3) the static approximation. The mass differences and the charges and the magnetic moments of the baryons are expressed as functions of the mass differences and the charges of pseudoscalar mesons. The results for the octet-type mass differences of baryons show excellent agreement with experimental results, but those for the 27-plet type mass differences show poor agreement with experiments. The B8B8V8 charge coupling is found to be of F type and is also found to have the same magnitude as the P8P8V8 coupling. The magnitudes of the magnetic moments of B8 by our method are small compared with experimental values. (Author)

AD-641 065 **Field 20J, 20F**
Not available from CFSTI.
Brandeis Univ., Waltham, Mass. Dept. of Physics.
A NOTE ON BOUNCING PHOTONS,
by F. A.E. Pirani. 11 Jan 65, 6p
Grant AF-AFOSR-368-65
Proj. AF-9751
Task 975101
AFOSR-66-1313
Availability: Published in Bull. Acad. Polonaise Sci., Serie des sciences math., astr. et phys v13 n3 p239-42 1965.

Descriptors: (*Photons, Transport properties), Relativity theory, Mathematical-models, Geometry, Transformations (Mathematics), Conform mapping.

J. L. Synge proposed a method of characterizing Fermi transport by a simple thought experiment with photons. However, his verification of the characterization is rather long and complicated. The purpose of this note is to give Synge's experiment an intrinsic geometrical description and a simple verification. This description makes manifest the conformal invariance of Fermi transport of directions. (Author)

AD-641 066 **Field 20J**
Not available from CFSTI.
Brandeis Univ., Waltham, Mass.
PROBLEMS AND PROSPECTS IN QUANTIZATION OF RELATIVITY,
by S. Deser. 1965, 8p
Grant AF-AFOSR-368-65
Proj. AF-9751
Task 975101
AFOSR-66-0802
Availability: Published in National Committee for the Celebration of the Centenary of the Birth of Galileo Gallilei (4th) 1965.

Descriptors: (*Relativity theory, *Field theory), Functional analysis, Hamiltonian.

In the report, the author discusses some current aspects of the quantization problem in general relativity, together with closely related classical questions. The viewpoint is that of Lorentz covariant quantum field theory, as employed in the joint work with R. Arnowitt and C. W. Misner on which most of this discussion will be based. (Author)

AD-641 067 **Field 20J, 20H**
Not available from CFSTI.
Boston Univ., Mass. Dept. of Physics.
GOLDSTONE BEHAVIOR IN SOME MODEL THEORIES,
by W. S. Hellman, and P. Roman. 28 Oct 65, 7p
Grant SR-385-65
Proj. AF-9751
Task 975101
AFOSR-66-1278
Availability: Published in The Physical Review v143 n4 p1247-51 Mar 25 1966.

Descriptors: (*Model theory, *Field theory), Invariance, Elementary particles, Quantum mechanics.

Identifiers: Goldstone's theorem, Massless particles.

Simple model theories characterized by bilinear interaction structures are studied. The interrelationship between nonvanishing vacuum expectation values of the fields, broken vacuum-state invariance, and constant-field translation invariance is pursued, in relation to the appearance of zero-mass particle poles in the propagators. The peculiar role of constant-field translation invariance is commented upon. (Author)

AD-641 068 **Field 20J, 20H**
Not available from CFSTI.
Boston Univ., Mass. Dept. of Physics.
ON THE ENERGY SPECTRUM OF DE SITTER WORLD THEORIES,
by P. Roman, and J. J. Aghassi. 21 Jan 66, 7p
Grant AF-AFOSR-385-65
Proj. AF-9751
Task 975101
AFOSR-66-1284
Availability: Published in Il Nuovo Cimento v42 (S10) p193-7 Mar 1966.

Descriptors: (*Field theory, *Relativity theory), Elementary particles, Groups (Mathematics), Nuclear energy levels.

Identifiers: de Sitter world theories, Unitary symmetry.

Recently a connection between space-time and internal symmetries and numerous consequences of de Sitter World Theories were established. The basis of this research was the adoption of a de Sitter space-time structure rather than that of a Minkowskain background. The symmetry of the de Sitter space with the (+++--+) signature is called script L5 symmetry and the Poincare group is the contracted de Sitter group. Sometime ago the observation was made that in an L5 theory the energy spectrum of the quantized E-operator would not be completely real, and that, therefore, a de Sitter theory of elementary particles ought to use a (+++ --) signature. However, the signature in L5 is physically more attractive because it gives the observed red galactic spectral line shifts. The purpose of this paper is to reconcile the two diverging viewpoints by reformulating the unitarity condition in the L5 group. (Author)

AD-641 152 **Field 20J**
Not available from CFSTI.
Vienna Univ. (Austria). Institut fuer Theoretische Physik.
ON CLASSICAL SYSTEMS WITH INTERNAL SYMMETRY GROUPS,
by Roman U. Sexl. 20 Apr 65, 9p
Contract AF 61 (052)-644
Proj. AF-9751
Task 975101
AFOSR-6-1715
Availability: Published in Acta Physica Austriaca v22 n1/4 p159-66 1966.

Descriptors: (*Hydrogen, Atomic orbitals), (*Atomic orbitals, Groups (Mathematics)), Transformations (Mathematics0, Quantum mechanics, Invariance, Harmonic analysis, Potential theory, Operators (Mathematics), Vector analysis, Momentum, Differential equations, Austria.

Identifiers: Symmetry (Quantum mechanics).

The invariance groups of the hydrogen atom and the harmonic oscillator are compared. They are known to be O4 and U (3) resp. The coordinates and momenta transform nonlinearly in the case of the hydrogen atoms. Therefore the finite symmetry transformations generated by Lenz's vector cannot be given in closed analytic form. A geometrical interpretation of these transformations is however easily possible. It is shown, furthermore, that closed orbits in classical physics always correspond to a degeneracy with respect to angular momentum in quantum mechanics. (Author)

AD-641 233 **Field 20J**
Not available from CFSTI.
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
TWO-COMPONENT SPINORS IN THE HAMILTONIAN FORMULATION OF GENERAL RELATIVITY,
by C. G. Oliveira. 26 Aug 65, 54p
Grant AF-AFOSR-789-65
Proj. AF-9767
Task 976704
AFOSR-66-0816
Availability: Published in Nuovo Cimento Supplemento ser1 v3 n2 p192-244 1965.

Descriptors: (*Hamiltonian, *Relativity theory), (*Tensor analysis, Relativity theory), Matrix algebra, Field theory, Brazil.

Identifiers: Spinors.

Contents: Introduction; Four-dimensional formulation of general relativity in terms of two-component spinors; The Dirac formulation of the gravitational field; The dynamical variables in the spinor formulation; The Hamiltonian and the primary spin constraints; The Poisson brackets for points on different hyper-surfaces, to first order; Appendix.

AD-641 235 **Field 20J**
Not available from CFSTI.
Syracuse Univ., N. Y. Dept. of Physics.
HAMILTON-JACOBI AND SCHRODINGER THEORY IN THEORIES WITH FIRST-CLASS HAMILTONIAN CONSTRAINTS,
by P. G. Bergmann. 25 Oct 65, 4p
Grant AF-AFOSR-789-65
Proj. AF-9767
Task 976704
AFOSR-66-1415
Availability: Published in The Physical Review v144 n4 p1078-80 Apr 29 1966.

Descriptors: (*Relativity theory, *Quantum mechanics), Hamiltonian, Wave functions, Equations, Invariance, Groups (Mathematics), Transformations (Mathematics).

Brief proofs are given, applying in the case of classical Hamilton-Jacobi theory to the action, S, and in a Schrodinger-type quantum theory to the state vector, Psi, (1) that these quantities are independent of the time, t, and (2) that they as well as the equations obeyed by them are form-invariant under the invariance group of transformations, provided the invariance transformations are generated by constraints and provided these constraints include the Hamiltonian. In Dirac's version the equations of general relativity have all these properties. (Author)

AD-64 237 **Field 20J, 20H**
Not available from CFSTI.
Colorado Univ., Boulder. Dept. of Physics.
DYNAMICS OF A BROKEN 'SU SUB N' SYMMETRY FOR THE OSCILLATOR,
by A. O. Barut. 5 Apr 65, 5p
Grant AF-AFOSR-30-63
Proj. AF-9751
Task 975101
AFOSR-66-0828
Prepared in cooperation with International Atomic Energy Agency, International Centre for Theoretical Physics, Trieste, Italy.
Availability: Published in The Physical Review v139 n5B pB1433-6 Sep 6 1966.

Descriptors: (*Elementary particles, Groups (Mathematics)), Potential theory, Operators (Mathematics), Field theory, Vector analysis, Nuclear spins, Italy.

Identifiers: Quarks, Symmetry (Quantum mechanics).

All states of a one-dimensional harmonic oscillator are represented by a special unitary representation of the noncompact 2+1 Lorentz group. The direct product of N such representations leads to a degeneracy which is represented by the Group U sub N whereas all states of the N-dimensional oscillator are represented by the noncompact unitary group NU sub (N+(1 to the Nth)) whose Casimir operator determines the energy spectrum. The anharmonic oscillator is represented by a broken symmetry and mass-splitting formulas are obtained. It is shown how new quantum numbers arise from the direct products of basic dynamical groups, corresponding to composite structures. (Author)

AD-641 239 **Field 20J**
Not available from CFSTI.
Syracuse Univ., N. Y. Dept. of Physics.
RADIATION AND OBSERVABLES,
by P. G. Bergmann. 1965 17p
Grant AF-AFOSR-789-65
Proj. AF-9767
Task 976704
AFOSR-66-1333
Prepared in cooperation with Yeshiva Univ., New York.
Availability: Published in Atti del Convegno Sulla Relativita Generale: Problemi Dell'Energia e Onde Gravitazionali, Firenze p3-16 1965.

Descriptors: (*Relativity theory, *Field theory), Invariance, Groups (Mathematics), Transformations (Mathematics).

The contents of this talk by Professor Bergmann (From the National Committee for the Celebration of the IV Centennial of the Birth of Galileo Galilei) concerns the concept of observables as it has developed in general relativity and what one may learn about it from the consideration of radiative solutions of the field equations. (Author)

AD-641 242 **Field 20J, 20H**
Not available from CFSTI.
Colorado Univ., Boulder. Dept. of Physics.
INVARIANT AMPLITUDES AND THE INTERPRETATION OF SU (3)- AND SU (6)-TYPE SYMMETRIES,
by A. O. Barut. 1963, 17p
Grant AF-AFOSR-30-63
Proj. AF-9751
Task 975101
AFOSR-66-0820
Prepared in cooperation with International Centre for Theoretical Physics, Trieste (Italy).
Availability: Published in High-Energy Physics and Elementary Particles, p707-21 1965.

Descriptors: (*Elementary particles, Groups (Mathematics)), Nuclear spins, Nuclear scattering, Invariance, Tensor analysis, Italy.

Identifiers: Symmetry (Quantum mechanics).

Different types of representations of the Poincare group, according to the choice of the diagonalized subgroup, and different realizations in each type are reviewed. The construction of invariant and covariant amplitudes are discussed on the basis of a global representation. The two ways in which the spin-orbit effects enter into the amplitude are discussed. Then starting with the amplitudes under the exact invariance group of the strong interactions, it is shown that one obtains automatically terms in the amplitude which are SU (3), SU (4) and SU (6) invariant, with other terms having definte transformation properties. A criterion is given when these symmetries (especially those of the SU (4) and SU (6) type) are consistent approximate symmetries. (Author)

AD-641 245 **Field 20J**
Not available from CFSTI.
Colorado Univ., Boulder. Dept. of Physics.
SIMULTANEOUS ANALYTIC CONTINUATION TO THE SECOND SHEET IN TWO CROSSED CHANNELS AND THE DETERMINATION OF COUPLING CONSTANTS,
by A. O. Barut, and T. Sawada. 4 Jan 65, 4p
Grant AF-AFOSR-30-63
Proj. AF-9751
Task 975101
AFOSR-66-0829
Prepared in cooperation with International Centre for Theoretical Physics, Trieste (Italy).
Availability: Published in Physics Letters v14 n3 p248-9 Feb 1 1965.

Descriptors: (*Elementary particles, Complex variables), Functions, Nuclear scattering.

Identifiers: Scattering amplitude.

The purpose of the note is to give a justification to the remarkable relation between the coupling constants and a particular second sheet singularity. It is shown that the postulate which allowed an exact determination of coupling constants within the context of strong interactions can be reduced to a generalized form of analyticity to the effect that the scattering amplitude is, in all its Riemann sheets, as analytic as possible consistent with unitarity. (Author)

N66-32115 **Field 20J**
CFSTI Prices HC$2.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
A PERTURBATION THEORY OF THE CONSTRAINED VARIATIONAL METHOD IN MOLECULAR QUANTUM MECHANICS.
by W. B. Brown. 8 Mar 65, 34p NASA-CR-67830, WIS-TCI-83
Grant NSG-275-62

Descriptors: *Molecular energy, *Perturbation theory, *Quantum mechanics, *Variational principle, Constraint, Energy, Expectancy, Function, Hydride, Lithium, Mechanics, Molecular, Operator, Perturbation, Principle, Quantum, Theory, Variation, Wave.

For abstract, see STAR 04 17.

AD-640 640 **See Field 7D**

AD-640 853 **See Field 20C**

AD-641 034 **See Field 20H**

AD-641 036 **See Field 20L**

AD-641 071 **See Field 12A**

AD-641 090 **See Field 20F**

AD-641 094 **See Field 20L**

AD-641 192 **See Field 20H**

AD-641 207 **See Field 7D**

AD-641 209 **See Field 7D**

AD-641 210 **See Field 7D**

AD-641 211 **See Field 7D**

AD-641 212 **See Field 7D**

AD-641 232 **See Field 20C**

AD-641 240 **See Field 20H**

20K. SOLID MECHANICS

AD-462 075 **Field 20K**
CFSTI Price: HC$2.60
Stanford Univ., Calif. Div. of Engineering Mechanics.
ON VARIATIONAL PRINCIPLES IN FINITE ELASTICITY,
by N. C. Huang. Mar 65, 22p Technical rept. TR-154
Contract Nonr-225 (69)

Descriptors: (*Elasticity, Theory), Deformation, Tensor analysis, Stresses, Strain (Mechanics), Calculus of variations, Numerical methods and procedures, Mechanics.

In this paper, two variation principles are formulated for the theory of finite elasticity. The first variational principle is an extension of Hu and Washizu's variational principle and the second is a generalization of the theory of stationary potential energy in classical elasto-statics. New variational variables are introduced. The Euler equations are Rivlin's field equations expressed in terms of undeformed state variables for the theory of finite elasticity. Three examples are solved by the variational technique for illustrative purposes. (Author)

AD-480 619 **Field 20K**
CFSTI Prices: HC$10.60 MF$0.75
Ship Structure Committee, Washington, D. C.
CRACK EXTENSION AND PROPAGATION UNDER PLANE STRESS.
Progress rept. no. 2,
by A. R. Rosenfield, P. K. Dai, and G. T. Hahn.
Mar 66, 105p SSC-172
Contract NObs-92383
Proj. SR-164

Descriptors: (*Strain (Mechanics), *Metal plates), Creep, Iron alloys, Silicon alloys, Steel, Stresses, Thickness, Elasticity, Plasticity, Hardening, Deformation, Tensile properties, Fracture (Mechanics), Propagation, Notch sensitivity, Mathematical models, Ductility, Brittleness.

Experiments are described that reveal the three-dimensional character of the plastic zone in front of notches and cracks in plates of an Fe-3Si steel and a plain carbon steel. These define the plane-stress regime as a function of applied stress and plate thickness. They also provide a rationale for the DM (Dugdale-Muskhelishvili) model as a tentative elastic-plastic solution of a crack under plane stress. Refinements that offer a way of taking work hardening and rate-sensitive plastic deformation into account are described. In this way, unnotched tensile properties --the stress-strain curve and reduction in area--are used to calculate plastic-zone size, crack-tip displacements and strains, the crack-extension stress, and the fracture toughness, in accord with experiments. Finally, the approach is extended to ductile crack propagation and used to calculate the crack speed and the stress, strain, and strain rates imposed on material in advance of a moving crack. (Author)

AD-640 689 **Field 20K, 11F, 11B, 11D K**
CFSTI Prices: HC$7.00 MF$1.75
Battelle Memorial Inst., Columbus, Ohio.
DAMPING CAPACITY OF MATERIALS.
by Robert E. Maringer. 3 Jan 66, 394p
Contract DA-01-021-AMC-11706 (Z)
RSIC-508-Vol-2
See also AD-640 465.

Descriptors: (*Materials, *Damping), Bibliographies, Internal friction, Metals, Alloys, Ceramic materials, Plastics, Composite materials.

This report contains a brief introduction to the field of damping capacity in metals and an extensive, annotated bibliography. The introductory material presents the fundamentals of damping, general methods of measuring internal friction or damping capacity, and some representative damping properties. The bibliography contains over 2300 references to pertinent literature published from 1955 through 1965, and is cross-indexed by both author and subject. (Author)

AD-640 703 **Field 20K**
Not available from CFSTI.
Illinois Univ., Urbana.
PROGRESS IN THE MICRODYNAMICAL THEORY OF PLASTICITY,
by J. J. Gilamn. 1966, 19p
AROD-4947:4
Availability: Published in Proceedings U. S. National Congress Applied Mechanics ASME (5th), p385-402 New York, 1966.

Descriptors: (*Plasticity, Theory), Creep, Crystal lattice defects, Equations of motion, Strain (Mechanics), Impact tests, Loading (Mechanics), Stresses.

It is shown that macroscopic creep, stress-strain, and impact tests can all be interpreted in terms of the same strain-rate equation that is based on the microscopic behavior of dislocations. This rate equation forms the basis of a phenomenological theory of plasticity which allows the prediction of plastic behavior in a wide variety of circumstances, and which contains classical plasticity theory as a special case. (Author)

AD-640 773 **Field 20K**
Not available from CFSTI.
Kentucky Univ., Lexington.
THE HEAT GENERATED DURING THE TORSIONAL OSCILLATIONS OF COPPER TUBES,
by O. W. Dillon Jr. 29 Apr 65, 26p
Contract AF 49 (638)-1306
Proj. AF-9782
Task 978201
AFOSR-66-1092
Availability: Published in International Journal of Solids Structures v2 p181-204 1966.

Descriptors: (*Pipes, Oscillation), (*Thermal radiation, Pipes), Copper, Plasticity, Theory, Partial differential equations, Experimental data, Hysteresis, Deformation.

Experimental data on the heat generated during slow torsional oscillations of annealed OFHC copper tubes are presented. These oscillations involve a strain amplitude of approximately 1/2 per cent so that plastic deformations occur. The frequency of oscillation is less than 1/4 c/s. It is demonstrated that there is a period when nearly adiabatic conditions exist and all observations are made in this time. It is demonstrated that the rate of doing plastic work sometimes exceeds the rate of heat generation and vice-versa. Over a complete cycle the work always exceeds the heat that is generated, but locally this is not the case. Specimens, which are releasing more heat than the plastic work that is being done on them have unsymmetrical hysteresis loops and sometimes deform nonhomogeneously in the first cycle. All specimens require more plastic work than they release as heat when they leave the elastic region in the first cycle. A coupled thermoplasticity theory which is consistent with the experimental data is also presented. (Author)

AD-640 787 **Field 20K**
Not available from CFSTI.
Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
AXISYMMETRIC VIBRATIONS OF PROLATE SPHEROIDAL SHELLS.
by F. DiMaggio, and R. Rand. 1966, 8p
Availability: Published in Journal of the Acoustical Society of America v40 n1 p179-86 Jul 1966.

Descriptors: (*Structural shells, Vibration), Frequency, Numerical analysis, Spheres.

Nontorsional extensional axisymmetric modes and frequencies of elastic prolate spheroidal shells as a function of eccentricity are obtained by a numerical technique. The mode spectra have two distinct branches, analogous to those of spherical and cylindrical shells. Extensive results are presented for the lower branches. (Author)

AD-640 838 **Field 20K, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Southampton Univ. (England). Inst. of Sound and Vibration Research.
SIGNIFICANCE OF THE DISCONTINUITY IN S/N FATIGUE CURVES.
Memo.,
by T. R. G. Williams, and P. J. Mitchell. Jan 65, 23p ISAV-118
Contract AF 61 (052)-504

Descriptors: (*Fatigue (Mechanics), *Steel), Tests, Graphics, Great Britain.

The significance of the discontinuity in the S/N fatigue curve has been assessed by comparative testing under constant load and constant strain conditions. Reinforcement of the surface grain of a mild steel and a stainless steel have produced a large improvement in fatigue strength, the fatigue limit coinciding with the discontinuity. (Author)

AD-640 839 **Field 20K, 12A**
CFSTI Prices: HC$3.00 MF$0.75
Southampton Univ. (England). Inst. of Sound and Vibration Research.
THE APPLICATION OF FINITE ELEMENT TECHNIQUES TO PLATE AND SHELL PROBLEMS.
Memo.,
by M. Petyt. Feb 65, 58p ISAV-120
Contract AF 61 (052)-504

Descriptors: (*Structural parts, Mechanical properties), Vibration, Structural shells, Flat plate models, Mathematical analysis, Matrix algebra, Great Britain.

Identifiers: Matrix displacement method.

The technique of applying the matrix displacement method of structural analysis to various static and dynamic plate and shell problems has been developed. The plate or shell under consideration is idealized into an assemblage of finite elements interconnected at their nodal points. The method of calculating the individual element stiffness matrices is illustrated by considering a triangular element. The equilibrium of the complete structure is then considered. Problems involving geometrical nonlinearities have been solved by a step-by-step procedure to permit linearization. (Author)

AD-640 858 **Field 20K, 20M**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., San Diego, La Jolla. Dept. of the Aerospace and Mechanical Engineering Sciences.
DISSIPATION FUNCTION IN THERMOMECHANICAL PHENOMENA OF VISCOELASTIC SOLIDS.
Technical rept.,
by N. C. Huang. Oct 66, 23p TR-1
Contract N00014-67-A-0109-0003
Proj. NR-064-496

Descriptors: (*Viscoelasticity, *Thermodynamics), Solids, Mechanics.

Identifiers: Dissipation function.

An explicit form of the dissipation function associated with thermomechanical phenomena of viscoelastic solids is derived. This function is expressed in terms of the observable quantities such as stress rates, strain rates, and their second time derivatives, etc. The formulation is based on the theory of irreversible thermodynamics of deformable bodies developed by Biot and generalized by Ziegler and Schapery. The proposed dissipation function can be used conveniently for both experimental and theoretical purposes. (Author)

AD-640 917 **Field 20K**
Not available from CFSTI.
Pennsylvania State Univ., University Park. Dept. of Engineering Mechanics.
A TRIAXIAL-STRESS EXPERIMENT ON YIELD CONDITION IN PLASTICITY,
by L. W. Hu, J. Markowitz, and T. A. Bartush. 1966, 9p
Grant AF-AFOSR-127-66

Proj. AF-9782
Task 978202
AFOSR-66-1675
Availability: Published in Experimental Mechanics p1-7 Jan 1966.

Descriptors: (*Stresses, Tests), Creep, Plasticity, Deformation, Hydrostatics, Brass.

A triaxial-stress experiment was developed for the determination of the intersections of the initial and subsequent yield surfaces with a hydrostatic stress-principal stress plane. Results of an experiment on Nittany No. 2 brass of the soft grade were reported. Information so obtained makes it possible for one to see the yield condition in the sense of a three-dimensional surface rather than a two-dimensional curve as observed in conventional biaxial-stress tests. (Author)

AD-640 963 **Field 20K, 13M**
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Engineering.
NORMALITY RELATIONS AND CONVEXITY OF YIELD SURFACES FOR UNSTABLE MATERIALS OR STRUCTURAL ELEMENTS.
Technical rept.,
by A. C. Palmer, G. Maier, and D. C. Drucker.
Sep 66, 40p TR-49, Nonr-562 (20)/49
Contract Nonr-562 (20)
Proj. NR-064-424

Descriptors: (*Materials, *Plasticity), (*Structures, Plasticity), Stresses, Deformation, Loading (Mechanics), Surfaces, Structural properties.

The stress-strain relations for materials and the load-deflection relations for structural elements play corresponding roles in the analysis of three-dimensional continua and of structures respectively. Mathematically equivalent and phenomenologically quite similar, they are treated simultaneously here. As in previous treatments of stable (rising) plastic stress-strain curves, unstable (falling) curves in simple shear or tension are generalized to all states of stress through the exploration of the work done in a cycle of stress (Drucker) and in a cycle of strain (Ilyushin). The plastic increment of strain is found to be normal to the current yield surface for a wide class of unstable materials in which a continuous variation of strain produces a unique continuous variation of stress and of the shape and position of the yield surface. In the absence of any significant alteration in the (stable) elastic response, each yield surface then is shown to be convex. The degree of concavity possible when the elastic response is stable but is non-linear and does alter appreciably due to plastic deformation is illustrated by a non-linear elastic spring and a plastic block in parallel. Such concavity would not be observable in the yield surfaces of common structural metals, but might be found for soils, rocks or concrete and can be quite pronounced for structural elements. (Author)

AD-641 133 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Structural Mechanics Lab.
ON STRESS WAVES IN VISCOELASTIC MEDIA CONDUCTING HEAT.
Technical rept.,
by J. D. Achenbach, S. M. Vogel, and G. Herrmann. Aug 66, 25p TR-66-5
Contract Nonr-1228 (34)
Prepared for presentation at the IUTAM Symposium on Irreversible Aspects of Continuum Mechanics, Vienna (Austria), Jun 1966.

Descriptors: (*Thermal stresses, *Viscoelasticity), Thermal conductivity, Heat exchangers, Propagation, Damping, Thermodynamics.

The theory of propagating surfaces of discontinuity is used to study one-dimensional stress waves in viscoelastic media which conduct heat. The constitutive laws for stress and entropy are derived from the specific free energy which is taken in the form of a functional expansion to the second order in strain and to the third order in temperature change. With the aid of these laws, relations are developed between the kinematical, mechanical and thermodynamical quantities at the wave front. Explicit expressions are established for both the velocity and the change of magnitude of the stress discontinuity as it propagates through the medium. The results include the effects of viscous damping, temperature-dependent material properties and thermomechanical coupling. (Author)

AD-641 203 **Field 20K, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md. Explosion Dynamics Div.
ON THE POSSIBILITY OF A PRECURSOR MEMORY EFFECT IN CRYSTALLINE SOLIDS,
by Paul Harris. 16 Sep 66, 17p
Task MAT-03L-000/R011-01-01
NOLTR-66-175

Descriptors: (*Shock waves, Solids), Crystals, Iron, Equations of motion, Mathematical models, Attenuation.

A simple qualitative model is developed for the existence of a precursor memory effect. By using our model we investigate Taylor's prediction of a memory in Armco iron and conclude that his theory leading to the memory prediction is incomplete in that it neglects viscous effects occurring in the precursor shock front region and plasticity contributions to the stress. When such effects are incorporated into the theory the amount of memory is shown to be diminished. (Author)

AD-641 234 **Field 20K, 20L**
Not available from CFSTI.
John Carroll Univ., Cleveland, Ohio.
TEMPERATURE DEPENDENCE OF THE ELASTIC CONSTANTS OF SODIUM.
Interim rept.,
by Mary E. Diederich, and J. Trivisonno. 7 Oct 65, 8p
Grant AF-AFOSR-862-65
Proj. AF-9763
Task 976303
AFOSR-66-1304
Revision of manuscript submitted 10 Jul 65.
Availability: Published in J. Phys. Chem. Solids v27 p637-42 1966.

Descriptors: (*Sodium, *Elasticity), Thermal properties, Ultrasonic radiation, Shear stresses, Compressive properties, Modulus of elasticity, Anisotropy.

The adiabatic elastic constants of single crystal sodium were measured as a function of temperature from 195K to 78K by the ultrasonic pulse-echo technique. In order to eliminate transit time errors a buffer technique was employed. The shear constants C and C' are interpreted in terms of Fuchs' electrostatic contribution to the shear stiffness of the alkali metals. The results of this work are in agreement with those of Daniels at 300K and the shear constants are within 3% of the values computed by Quimby and Siegel. The results are also compared with Bender's value of the elastic constants at 90K and with Swenson's isothermal compressional data. (Author)

AD-641 259 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania Univ., Philadelphia. School of Metallurgical Engineering.
THE EFFECT OF STRUCTURAL VARIABLES.
Annual summary rept.,
by Norman Brown. 14 Oct 66, 4p
Contract Nonr-551 (56)

Descriptors: (*Strain (Mechanics), Metals), Laboratory equipment, Pasticity, Stresses, Crystal lattice defects, Friction.

Experimental effort was spent in trying to make a new microstrain apparatus work in compression at helium temperatures. The instrumental nonlinearities in the load-deformation curve were removed by correcting small amounts of bending in the apparatus. Finally linearity but not retrace was obtainable where the lack of retrace was shown to be instrumental in origin and not depend on the specimen.

N66-30079 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Flight Research Center, Edwards, Calif.
A PRETENSIONING CONCEPT FOR RELIEF OF CRITICAL LEADING-EDGE THERMAL STRESS.
by J. M. Jenkins. Jul 66, 27p NASA-TN-D-3507

Descriptors: *Leading edge, *Stagnation region, *Thermal stress, Compression, Critical, Cross section, Edge, High temperature, Leading, Mathematics, Model, Reduction, Region, Stagnation, Stress, Tension, Thermal.

For abstract, see STAR 04 17.

N66-30175 **Field 20K**
CFSTI Prices HC$3.00 MF$0.50
California Univ., Berkeley. Structural Engineering Lab.
FINITE ELEMENT SOLUTION OF AXISYMMETRICAL DYNAMIC PROBLEMS OF SHELLS OF REVOLUTION.
by H. Y. Chow, and E. P. Popov. Apr 66, 53p NASA-CR-76100, SESM-66-3
Grant NSG-274

Descriptors: *Dynamic response, *Free vibration, *Mode shape, *Natural frequency, *Symmetrical body, Axisymmetry, Body, Dynamic, Element, Finite, Free, Frequency, Mode, Natural, Plate, Response, Rotation, Shape, Shell, Solution, Symmetry, Vibration.

For abstract, see STAR 04 17.

N66-30596 **Field 20K**
CFSTI Prices HC$4.00 MF$1.00
California Univ., Los Angeles.
OPTIMUM DESIGN OF COLUMNS SUPPORTED BY TENSION TIES.
by H. R. Mauch. 1966, 150p NASA-CR-76245
Grant NSG-423

Descriptors: *Circular tube, *Column, *Optimization, *Structural design, Buckling, Circular, Cylinder, Design, Stress, Structural, Strut, Support, Tension, Thin, Tube, Wall, Weight, Wire.

For abstract, see STAR 04 17.

N66-30750 **Field 20K**
CFSTI Prices HC$5.00 MF$1.00
General Dynamics/convair, San Diego, Calif. Advanced Structures Group.
STUDY OF STABILITY OF UNPRESSURIZED SHELL STRUCTURES UNDER STATIC LOADING, VOLUME I FINAL REPORT.
by F. A. Dittoe, and G. W. Smith. 21 Apr 66. 169p NASA-CR-76254, GDC-DDG66-008, VOL. I
Contract NAS8-11181

Descriptors: *Axial compression, *Circular shell, *Cylindrical shell, *Instability, *Orthotropic shell, *Stiff structure, Axial, Buckling, Circular, Compression, Computer, Cylinder, Digital, Orthotropism, Prediction, Program, Shell, Sizing, Stiffness, Structure, Theory.

For abstract, see STAR 04 17.

N66-30757 **Field 20K**
CFSTI Prices HC$7.63 MF$2.25
General Dynamics/convair, San Diego, Calif. Research, Development And Engineering Dept.

STUDY OF STABILITY OF UNPRESSURIZED SHELL STRUCTURES UNDER STATIC LOADING, VOLUME II FINAL REPORT.
by F. A. Dittoe, and G. W. Smith. 21 Apr 66, 464p NASA-CR-76325, GDC-DDG66-008, VOL) II
Contract NAS8-11181

Descriptors: *Axial compression, *Cylindrical shell, *Instability, Axial, Buckling, Circular, Compression, Computer, Cylinder, Digital, Isotropic, Loading, Panel, Program, Shell, Skin, Static, Stiffness, Strength.

For abstract, see STAR 04 17.

N66-30786 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
ON THE IMPACT INDUCED STRESS WAVES IN LONG BARS.
by S. Utku. 15 Jul 66, 29p NASA-CR-76293, JPL-TR-32-932
Contract NAS7-100

Descriptors: *Bar, *Characteristic method, *Impact, *Stress wave, Characteristic, Induction, Long, Method, Shock, Solution, Strain, Stress, Velocity, Wave.

For abstract, see STAR 04 17.

N66-30787 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
COMPUTATION OF STRESSES IN TRIANGULAR FINITE ELEMENTS.
by S. Utku. 15 Jun 66, 37p NASA-CR-76292, JPL-TR-32-948
Contract NAS7-100

Descriptors: *Stress calculation, *Thin walled shell, Aeolotropism, Calculation, Change, Curvature, Deflection, Element, Finite, Force, Linear, Material, Method, Node, Shell, Strain, Stress, Tensor, Thin, Triangle, Wall.

For abstract, see STAR 04 17.

N66-30792 **Field 20K**
CFSTI Prices HC$7.76 MF$2.25
North American Aviation, Inc., Los Angeles, Calif.
STUDY OF SHELL SUPPORTED RING FRAMES WITH OUT- OF-PLANE LOADING FINAL REPORT, 24 JUN. - 28 DEC. 1965.
by G. H. Arvin, E. Baumann, and P. E. Bisch. 3 Mar 66, 476p NASA-CR-76274, NA-65-1015
Contract NAS8-20097

Descriptors: *Cylindrical shell, *Deflection, *Load distribution, *Ring structure, Algebra, Circular, Computer, Cylinder, Digital, Distribution, Frame, Internal, Load, Matrix, Out-of-plane, Program, Ring, Shell, Solution, Structure, Support.

For abstract, see STAR 04 17.

N66-31214 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Martin Co., Denver, Colo.
BUCKLING OF CYLINDRICAL SHELL END CLOSURES BY INTERNAL PRESSURE.
by A. A. Holston Jr, and G. A. Thurston. Jul 66, 27p NASA-CR-540
Contract NAS1-4782

Descriptors: *Buckling, *Cylindrical shell, *Internal pressure, Closure, Cylinder, Dome, Ellipse, End, Internal, Load, Pressure, Shallow, Shell, Sphere, Stress.

For abstract, see STAR 04 17.

N66-31229 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATION OF A DOUBLE LINEAR DAMAGE RULE TO CUMULATIVE FATIGUE.
by C. R. Ensign, J. C. Freche, and S. S. Manson. 1966, 47p NASA-TM-X-52226
Presented At The Symp. On Crack Propagation Sponsored By The Am. Soc. For Testing And Materials, Atlantic City, 26 Jun. - 1 Jul. 1966

Descriptors: *Crack formation, *Damage, *Fatigue life, *Metal fatigue, *Steel, Axial, Bending, Conference, Crack, Cumulative, Cycling, Formation, Metal, Prediction, Propagation, Strain, Stress.

For abstract, see STAR 04 17.

N66-31233 **Field 20K**
CFSTI Prices HC$4.50 MF$2.25
National Aeronautics And Space Administration, Washington, D. C.
STRUCTURAL SYSTEMS AND PROGRAM DECISIONS, VOLUME I.
1966, 437p NASA-SP-6008

Descriptors: *Computer method, *Management planning, *Performance prediction, *Saturn v launch vehicle, *Systems design, Change, Computer, Design, Evaluation, Information, Management, Material, Method, Optimization, Performance, Planning, Prediction, Program, Structural, Structure, System, Weight.

For abstract, see STAR 04 17.

N66-31354 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
HYPERVELOCITY IMPACTS INTO STAINLESS-STEEL TUBES ARMORED WITH REINFORCED BERYLLIUM.
by N. Clough, J. H. Diedrich, and A. R. Mc millan. Jul 66, 18p NASA-TN-D-3512

Descriptors: *Hypervelocity impact, *Reinforced shell, Beryllium, Compartmentation, Cracking, Cratering, Damage, Fiber, Gas, Gun, Hypervelocity, Impact, Light, Mesh, Projectile, Reinforced, Shell, Stainless, Stainless steel, Steel, Tube.

For abstract, see STAR 04 17.

N66-31666 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
AXISYMMETRIC THERMAL STRESSES IN SANDWICH SHELLS OF REVOLUTION WITH APPLICATION TO SHALLOW, SPHERICAL SHELLS.
by H. E. Williams. 15 Jul 66, 32p NASA-CR-76428, JPL-TR-32-920
Contract NAS7-100

Descriptors: *Axisymmetric deformation, *Bending moment, *Shell stability, *Spherical shell, *Thermal stress, Axisymmetry, Bending, Coefficient, Deformation, Distribution, Equation, Force, Influence, Moment, Revolution, Sandwich, Shallow, Shell, Sphere, Stability.

For abstract, see STAR 04 17.

N66-31670 **Field 20K**
CFSTI Prices HC$3.00 MF$0.50
Martin Co., Denver, Colo.
BUCKLING OF IMPERFECT CYLINDERS UNDER AXIAL COMPRESSION.
by M. A. Freeland, and G. A. Thuton. Jul 66, 51p NASA-CR-541
Contract NAS1-4782

Descriptors: *Axial compression, *Compression buckling, *Donnell equation, *Newton theory, Axial, Buckling, Compression, Computer, Cylinder, Imperfection, Load, Mechanics, Numerical, Solution, Structural, Theory.

For abstract, see STAR 04 17.

N66-31930 **Field 20K**
CFSTI Prices HC$3.75 MF$1.50
General Dynamics/convair, San Diego, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
DYNAMIC LOADS ANALYSIS OF SPACE VEHICLE SYSTEMS - LAUNCH AND EXIT PHASE.
by B. A. Appleby, J. D. Martin, and R. H. Schuett. Jun 66, 246p NASA-CR-76502, GDC-DDE66-012
Contracts NAS7-100, JPL-950994
Prepared For Jpl

Descriptors: *Dynamic load, *Frequency response, *Space vehicle, *Structural dynamics, Analysis, Atmospheric, Damping, Disturbance, Dynamic, Dynamics, Engine, Frequency, Ground, Jettisoning, Launch, Load, Response, Shutdown, Staging, Start, Structural, Vibration, Wind.

For abstract, see STAR 04 17.

N66-32329 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EXPERIMENTS TO DETERMINE THE STRENGTH OF FILAMENT-WOUND CYLINDERS LOADED IN AXIAL COMPRESSION.
by M. F. Card. Aug 66, 38p NASA-TN-D-3522

Descriptors: *Axial compression, *Compression loading, *Cylindrical shell, *Filament winding, Axial, Buckling, Compression, Cylinder, Epoxy, Failure, Filament, Glass, Loading, Multilayer, Shell, Strength, Winding.

For abstract, see STAR 04 17.

N66-32426 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Northwestern Univ., Evanston, Ill. Structural Mechanics Lab.
MODELS DEMONSTRATING INSTABILITY OF NONCONSERVATIVE MECHANICAL SYSTEMS TECHNICAL REPORT NO. 66-4.
by G. Herrmann, S. Nemat-nasser, and S. N. Prasad. Jun 66, 37p NASA-CR-76763
Grant NSG-605

Descriptors: *Flutter, *Instability, *Mechanical system, Circulatory, Divergence, Dynamic, Elastic, Equilibrium, Force, Mechanical, Model, Nonconservative, Nondissipative, Stability, Static, Static divergence, Structural, System.

For abstract, see STAR 04 17.

N66-32435 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill. Inst. For The Study Of Metals.
THEORY OF SURFACE ION NEUTRALIZATION.
by V. Heine. Mar 66, 18p NASA-CR-76759
Grant NSG-352

Descriptors: *Coulomb potential, *Neutralization, *Surface ionization, Electron, Element, Energy, Excitation, Intensity, Ion, Ionization, Matrix, Potential, Surface, Theory, Variation.

For abstract, see STAR 04 17.

N66-32548 Field 20K
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
FLUTTER AT MACH 3 OF THERMALLY STRESSED PANELS AND COMPARISON WITH THEORY FOR PANELS WITH EDGE ROTATIONAL RESTRAINT.
by S. C. Dixon, J. L. Shideler, and C. P. Shore. Aug 66, 29p NASA-TN-D-3498

Descriptors: *Panel flutter, *Supersonic flow, *Supersonic speed, *Thermal stress, Edge, Flow, Flutter, Isotropy, Panel, Restraint, Rotation, Stress, Supersonic, Thermal.

For abstract, see STAR 04 17.

N66-32549 Field 20K
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And SpaceAdministration. Ames Research Center, Moffett Field, Calif.
A THEORETICAL ANALYSIS OF THE FLUTTER OF ORTHOTROPIC PANELS EXPOSED TO A HIGH SUPERSONIC STREAM OF ARBITRARY DIRECTION.
by P. A. Gaspers Jr, and B. Redd. Aug 66, 32p NASA-TN-D-3551

Descriptors: *Flutter analysis, *Supersonic flow, Analysis, Angle, Arbitrary, Bending, Critical, Deflection, Differential, Direction, Dynamic, Equation, Flat, Flow, Flutter, High, Orthotropism, Panel, Panel flutter, Partial, Plate, Pressure, Rectangle, Small, Stiffness, Stream, Supersonic, Theory.

For abstract, see STAR 04 17.

N66-32614 Field 20K
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SUPERSONIC FLUTTER OF FLAT RECTANGULAR ORTHOTROPIC PANELS ELASTICALLY RESTRAINED AGAINST EDGE ROTATION.
by L. L. Erickson. Aug 66, 36p NASA-TN-D-3500

Descriptors: *Dynamic load, *Flutter analysis, *Rectangular panel, *Supersonic flutter, Analysis, Dynamics, Flat, Flutter, Load, Mathematics, Orthotropism, Panel, Rectangle, Restraint, Solution, Supersonics.

For abstract, see STAR 04 17.

N66-32628 Field 20K
CFSTI Prices HC$3.75 MF$1.25
Ling-temco-vought, Inc., Dallas, Tex. Astronautics Div.
STRUCTURAL LOAD TEST RESULTS EVALUATION, ABL X-259 MOTOR LOADED AND UNLOADED CASE.
by J. R. Hyden. 29 Apr 66, 216p NASA-CR-66151
Contract NAS1-3899
Its Rept.-23.276

Descriptors: *Load test, *Rocket motor case, *Structural engineering, Case, Engineering, Grain, Internal, Load, Motor, Propellant, Rocket, Static firing, Strain, Structural, Test.

For abstract, see STAR 04 17.

N66-32673 Field 20K
CFSTI Prices HC$4.25 MF$2.00
Alabama Univ., University. Bureau Of Engineering Research.
A STUDY OF THE STABILITY OF REINFORCED CYLINDRICAL AND CONICAL SHELLS SUBJECTED TO VARIOUS TYPES AND COMBINATIONS OF LOADS FINAL REPORT.
by W. K. Rey. Apr 66, 388p NASA-CR-76846
Contract NAS8-11155

Descriptors: *Conical shell, *Cylindrical shell, *Structural stability, Axial, Circular, Compression, Conical, Cylinder, Distribution, Loading, Plastic, Shell, Stability, Stress, Structural.

For abstract, see STAR 04 17.

N66-32674 Field 20K
CFSTI Prices HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex. Dept. Of Mechanical Sciences.
A COMPARISON OF THEORETICAL AND EXPERIMENTAL PRESSURES AND FORCES ACTING ON A RINGBAFFLE UNDER SLOSHING CONDITIONS TECHNICAL REPORT NO. 10.
by L. R. Garza. May 65, 33p NASA-CR-76836
Contract NAS8-1555

Descriptors: *Damping, *Liquid sloshing, *Loading, *Pressure distribution, *Ring, Amplitude, Baffle, Distribution, Excitation, Force, Frequency, Liquid, Perforation, Pressure, Resonance, Sloshing, Tank.

For abstract, see STAR 04 17.

N66-37034 Field 20K
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AN INVESTIGATION OF SPRAY VELOCITY RESULTING FROM HIGH-VELOCITY PENETRATION OF THIN PLATES BY DISKS.
by J. D. Di battista. Sep 66, 35p NASA-TN-D-3618

Descriptors: *Meteoroid protection, *Shock wave, *Thin plate, Aluminum, Bumper, Foil, High velocity, Mechanics, Meteoroid, Penetration, Plate, Protection, Shock, Spray, Structural, Surface, Target, Thin, Tungsten, Velocity, Wave.

For abstract, see STAR 04 22.

N66-37036 Field 20K
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Ceter, Langley Station, Va.
DETERMINATION OF TEMPERATURE AND MATERIAL EFFECTS ON HIGH-VELOCITY IMPACT CRATERS IN ABLATIVE HEAT-SHIELD MATERIALS.
by J. R. Davidson, and P. E. Tippens. Sep 66, 24p NASA-TN-D-3631

Descriptors: *Ablating material, *Heat shield, *Impact damage, *Temperature effect, Ablation, Aluminum, Crater, Damage, Difference, Effect, Elastomer, Heat, High velocity, Impact, Material, Nylon, Phenol, Shield, Sphere, Target, Temperature.

For abstract, see STAR 04 22.

N66-37143 Field 20K
CFSTI Prices HC$3.25 MF$1.25
Bolt, Beranek, And Newman, Inc., Cambridge, Mass.
LOW-FREQUENCY NOISE REDUCTION OF SPACECRAFT STRUCTURES.
by R. E. Apfel, C. W. Dietrich, R. H. Lyon, R. W. Pyle , and E. E. Ungar. Sep 66, 173p NASA-CR-589
Contract NAS1-4687

Descriptors: *Noise reduction, *Spacecraft structure, Acoustics, Calculation, Experiment, Low frequency, Model, Noise, Prediction, Pressure, Reduction, Resonance, Spacecraft, Transmission, Vibration.

For abstract, see STAR 04 22.

N66-37155 Field 20K
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF PROJECTILE SIZE AND MATERIAL ON IMPACT FRACTURE OF WALLS OF LIQUID-FILLED TANKS.
by C. R. Morse, and F. S. Stepka. Sep 66, 16p NASA-TN-D-3627
Contract 124-08-01-36-22

Descriptors: *Aluminum, *Impact damage, *Projectile, *Steel, Effect, Fill, Fracture, Hypervelocity, Impact, Liquid, Material, Metal, Meteorite, Shell, Size, Sphere, Tank, Velocity, Wall.

For abstract, see STAR 04 22.

N66-37156 Field 20K
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EXPERIMENTAL AND THEORETICAL RESULTS FOR BUCKLING OF ECCENTRICALLY STIFFENED CYLINDERS.
by M. F. Card, and R. M. Jones. Oct 66, 25p NASA-TN-D-3639
Contract 124-11-06-04-23

Descriptors: *Compression buckling, *Cylindrical shell, *Eccentricity, *Stiff structure, Axial, Buckling, Compression, Cylinder, Elasticity, Load, Resistance, Shell, Stiffness, Strength, Structure.

For abstract, see STAR 04 22.

N66-37308 Field 20K
CFSTI Prices HC$3.00 MF$0.75
New York Univ., N. Y. Courant Inst. Of Mathematical Sciences.
A NONLINEAR SHELL THEORY COMPARED WITH THE CLASSICAL THREE-DIMENSIONAL THEORY OF ELASTICITY.
by C. B. Sensenig. Aug 66, 97p NASA-CR-78246, IMM-349
Grant NSG-412, Contract NSF GP-3465

Descriptors: *Deformation, *Elasticity, *Shell theory, Analysis, Boundary, Dimensional, Equilibrium, Nonlinear, Problem, Tensor, Three, Value.

For abstract, see STAR 04 22.

N66-37318 Field 20K
CFSTI Prices HC$4.00 MF$0.75
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile And Space Systems Div.
DEVELOPMENT OF VIBRATION DESIGN PROCEDURES FOR REPRESENTATIVE STRUCTURAL TYPES FINAL TECHNICAL REPORT, SEP. 1965 - JUL. 1966.
by J. H. Gunning, and D. E. Hines. Aug 66, 108p NASA-CR-78200, DAC-59301
Contract NAS8-20549

Descriptors: *Cantilever beam, *Damping, *Structural fatigue, Bending, Bracket, Design, Effect, Fatigue, Multimode, Random, Response, Spacecraft, Stress, Structure, Test, Torsion.

For abstract, see STAR 04 22.

N66-37523 Field 20K
CFSTI Prices HC$2.00 MF$0.50
General Motors Corp., Santa Barbara, Calif.
MEASUREMENTS OF SHOCK WAVE PRESSURES GENERATED BY HYPERVELOCITY IMPACTS IN ALUMINUM.
by J. A. Charest. Nov 64, 26p NASA-CR-78399, TR64-58
Contract NAS1-1118

Descriptors: *Hypervelocity impact, *Pressure measurement, *Shock wave, Aluminum, Determination, Generation, Impact, Particle, Pressure, Sphere, Target, Technique, Velocity.

For abstract, see STAR 04 22.

N66-37539 Field 20K
CFSTI Prices HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex. Dept. Of Mechanical Sciences.
A COMPARISON OF FLEXIBLE AND RIGID RING BAFFLES FOR SLOSH SUPPRESSION TECHNICAL REPORT NO. 1.
by L. R. Garza. 17 Aug 66, 46p NASA-CR-78355
Contract NAS8-20290

Descriptors: *Baffle, *Flexibility, *Liquid sloshing, *Rigid structure, Damping, Evaluation, Frequency, Performance, Resonance, Ring, Suppression.

For abstract, see STAR 04 22.

N66-37589 Field 20K
CFSTI Prices HC$2.00 MF$0.50
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
INTEREST AND REALIZATION OF PURE BENDING TESTS IN THE ELASTO-VISCO-PLASTUF DOMAIN.
Interet Et Realisation Des Essais De Flexion Circulaire Dans Le Domaine Elasto-visco- Plastique
by R. Labourdette. 1966, 47p ONERA-TN-99
In French, English Summary

Descriptors: *Bending moment, *Material testing, *Mechanical property, Bending, Compression, Creep, Elasticity, Hardening, Machine, Relaxation, Tension, Test.

For abstract, see STAR 04 22.

AD-640 557 See Field 13M

AD-640 558 See Field 13M

AD-640 559 See Field 13M

AD-640 560 See Field 13M

AD-640 593 See Field 17A

AD-640 835 See Field 11F

AD-640 887 See Field 8L

AD-640 900 See Field 13M

AD-641 202 See Field 20D

PB-173 216 See Field 13M

20L. SOLID STATE PHYSICS

AD-285 171 Field 20L
CFSTI Price: HC$6.60
Ohio State Univ. Research Foundation, Columbus. Electron Device Lab.
SOLUTIONS OF THE DIFFUSION EQUATION WITH MOVING BOUNDARIES.
Quarterly technical rept. no. 6, 1 Apr-30 Jun 62,
by M. O. Thurston, and Joseph Tsai. Jul 62, 64p
Contract DA-36-039-sc-87426
Proj. 1233

Descriptors: (*Boundary layer, *Diffusion), Boron, Equations, Mathematical analysis, Measurement, Motion, Oxides, Silicon.

A solution, supported by experimental results, for the boundary problem in which an impurity diffuses into silicon through an oxide layer that increases in thickness.

AD-448 504 Field 20L
CFSTI Price: HC$5.00
Radio Corp. of America, Princeton, N.J. Defense Electronic Products.
CRYOGENIC ASSOCIATIVE MEMORY TECHNIQUES.
Final rept.,
by Richard W. Ahrons, and Leslie L. Burns. May 64, 153p
Contract Nonr-3879 (00)

Descriptors: (*Cryogenic storage devices, Thin films (Storage devices)), Superconductivity, Computer storage devices, Superconductors, Magnetic fields, Design, Computer logic.

The problem in superconductive associative memories divides into two areas: (1) the basic cell and (2) the memory array. The superconducting memory array must retrieve the information or responses from the memory at reasonable times. The responses may be multiple. The conventional superconducting ladder network used for retrieving responses has a long time constant associated with it. One must resort to newer approaches such as the Sequentially Addressed Write (SAW) or the Sequentially Interrogated Ladder (SIL) to obtain reasonable speeds and to overcome the problems of interconnections. During the period of this contract, a new cell called the bridge cell was successfully tested. The lip cell, the associative superconductive memory version of the bridge cell, was also tested and a partial success with further tests limited by the termination of the contract. (Author)

AD-640 585 Field 20L, 9A, 18H
CFSTI Prices: HC$5.00 MF$1.00
Nortronics, Newbury Park, Calif. Applied Research Dept.
STUDY FOR GENERALIZED MODEL FOR SEMICONDUCTOR RADIATION RESPONSE PREDICTION.
Quarterly rept. no. 5, 15 Feb-15 Jun 66,
by James P. Raymond, and Robert E. Johnson. Oct 66, 158p ARD-66-49R
Contract DA-28-043-AMC-00423 (E)
ECOM-00423-5

Descriptors: (*Semiconductor devices, *Radiation damage), (*Integrated circuits, Radiation damage), Transients, Transistors, Numerical analysis, Mathematical models, Carriers (Semiconductors), Semiconductors.

The detailed bipolar transistor model has been extended to the general large-signal electrical and radiation-induced switching responses. Circulations have been made on the delay, rise, storage, and fall times resulting from electrical or radiation-induced common-emitter response. The radiation-induced transient response has been measured over the range of 0.3 to 100mads (Si) in a nominal 0.2 microsecs pulsed radiation environment. Radiation environments were the Nortronics 600-kv Flash x-ray and 10-Mev electron irradiation from the General Atomic LINAC. A brief comparison is made between measured and calculated electrical and radiation-induced responses. The lumped-model analysis has been extended to the circuit elements of junction- and dielectrically isolated integrated circuits. Considered are the resistor, diode, and transistor bipolar elements and the metal-oxide-semiconductor transistor. (Author)

AD-640 612 Field 20L
CFSTI Prices: HC$2.00 MF$0.50
Carlyle Barton Lab., John Hopkins Univ., Baltimore, Md.
DIRECT EVIDENCE FOR AND TRANSITION RATES OF ION PAIR INTERACTIONS IN LaC13:Ho3+,
by J. F. Porter Jr, and H. W. Moos. 1966, 27p
Contract DA 31-124-ARO (D)-103

Descriptors: (*Fluorescence, Holmium), (*Holmium, *Atomic energy levels), (*Lanthanum compounds, Chlorides), Crystal lattices, Impurities, Ions, Excitation, Electron transitions.

Identifiers: Lanthanum chloride.

Energy transfer between Ho (3+) ions in a LaC13 lattice was studied by means of relative fluorescence intensity measurements. By careful measurements of the relative fluorescence from E (5S2), C514), and Y (5I7) it was demonstrated that to within the experimental error, E relaxes to C only by an ion pair process. The concentration dependence of the pair process is linear. Assuming a simple model with a sharp radial drop off, an effective range of 7.5A (3rd nearest neighbor) was found for the ion pair interaction. (Author)

AD-640 675 Field 20L, 20F
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.
BRILLOUIN-SCATTERING DISPERSION IN FERROELECTRIC TRIGLYCINE SULFATE,
by Robert W. Gammon, and Herman Z. Cummins. 16 Jun 66, 4p
Contract DA-31-124-ARO (D)-400
AROD-5415:3
Availability: Published in Physical Review Letters v17 n4 p193-5 Jul 25 1966.

Descriptors: (*Ferroelectric materials, Optical properties), (*Phonons, Scattering), Ultrasonic radiation, Amino acids, Sulfates, Crystals, Light, Polarization.

Identifiers: Brillouin scattering, Triglycene sulfate.

Dispersion was observed in the Brillouin components of the light-scattering spectrum of triglycine sulfate. It is attributed to the Landau-Khalatnikov relaxation of fluctuations in the spontaneous polarization. (Author)

AD-640 684 Field 20L, 20F
Not available from CFSTI.
Chicago Univ., Ill. Inst. for the Study of Metals.
NONTENSORIAL ANISOTROPY OF THE OPTICAL FIELD EFFECT AT THRESHOLDS AND SADDLE-POINT EDGES.
Revised ed.,
by J. C. Phillips. 22 Feb 66, 6p
Research supported in part by ONR. Revision of manuscript submitted 17 Jan 66.
Availability: Published in Physical Review v146 n2 p584-9 Jun 10 1966.

Descriptors: (*Field theory, *Anisotropy), Line spectrum, Solid state physics, Absorption spectrum, Polarization, Brillouin zones, Optics.

Previous treatments of the optical field effect at direct interband threshold (Franz-Keldysh effect) are generalized to saddle-point edges (Seraphin effect). The discussion demonstrates that nontensorial anisotropies are present in both cases. For practical reasons, however, it appears that nontensorial anisotropy should be easier to observe in the Seraphin effect than in the Franz-Keldysh effect. The anisotropy enables one to assign an edge to interband critical points located in specific regions in the Brillouin zone, and thus provides a powerful tool for solid-state spectroscopy. Strain and nonlinear effects are discussed briefly. (Author)

AD-640 804 Field 20L, 18H
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Quarterly progress rept. no. 3, 1 Apr-30 Jun 66,
by John C. Corelli, A. Robb Frederickson, and James W. Westhead. Sep 66, 29p
Contract DA-28-043-AMC-01788 (E)
ECOM-01788-3
See also AD-634 488.

Descriptors: (*Semiconductors, *Radiation damage), (*Silicon, Transients), Electron bombardment, Resistance (Electrical), Hall effect, Carriers (Semiconductors), Life expectancy, Ionization.

The transient behavior of the resistivity and Hall effect voltage in 1 to 100 ohm-cm n-type silicon and in 100 ohm-cm p-type silicon has been studied following short bursts (< or = 4.5 microseconds) of 48 MeV electrons. The irradiations were performed with the sample temperatures in the 120-300 K range. The excess carrier lifetime is also determined by measuring the time decay of the resistivity voltage. The single dominant process which occurs is the production of excess carriers from ionization of atomic electrons, and their subsequent decay by recombination. The injection levels induced by the bombarding electrons are high (Delta n/n > 0.1) and in all cases the excess carrier lifetimes exhibit an increase with higher injection level. The number of excess carriers generated can be calculated within a factor of 2 from a knowledge of the ionization energy loss, the energy to form an ion pair, and the total integrated electron flux. The temperature dependence of induced conductivity as a function of injection is consistent with that predicted by theory. The transient Hall voltage response of 100 ohm-cm p-type silicon can be approximately reproduced by calculation assuming mixed hole-electron conduction and equal hole and electron decay times by a single time dependent exponential. A simple model to describe fast annealing in electron-irradiated silicon is given. (Author)

AD-640 855 **Field 20L**
Not available from CFSTI.
Battelle Memorial Inst., Columbus, Ohio.
THE HALL EFFECT AND RELATED PHENOMENA,
by A. C. Beer. 1965, 14p
Grant AF-AFOSR-525-66
Proj. AF-9761
Task 976102
AFOSR-66-1237
Availability: Published in Solid-State Electronics v9 p339-51 1966.

Descriptors: (*Solid state physics, Theory), Solids, Hall effect, Band theory of solids, Carriers (Semiconductors), Magnetic properties, Anisotropy, Scattering, Temperature, Impurities.

A review is presented of the theory of the Hall effect and related phenomena in solids. Basic principles are illustrated by application of the Lorentz force to moving charges in a free-electron system. Application to a real solid is indicated through a consideration of the effects of band structure and charge-carrier scattering mechanisms. Association is also made with the off-diagonal elements of the conductivity tensor, and the influence of certain symmetries in the medium is discussed. Special mention is made of specific parameters useful in characterizing a material for Hall-effect applications, including the dependence of the parameters on temperature and impurity content. The question of the variation of Hall coefficient with magnetic field is examined in some detail, with particular attention to band structure and crystal anisotropy, scattering, inhomogeneities and multiband effects. Differentiation is made between isothermal and adiabatic phenomena, and the importance of various thermomagnetic contributions is pointed out. Related galvanomagnetic phenomena which are discussed include magnetoresistance effect and also the magnetic-field dependence of the skin depth in the case of the transmission of a.c. fields through a disk. (Author)

AD-640 912 **Field 20L**
Not available from CFSTI.
University of Southern California, Los Angeles. Dept. of Materials Science.
CATHODOLUMINESCENCE AND IMPURITY VARIATIONS IN Te-DOPED GaAs,
by David B. Wittry. 7 Feb 66, 5p
Grant AF-AFOSR-76-66
Proj. AF-9761
Task 976103
AFOSR-66-1631
Availability: Published in Applied Physics Letters v8 n6 p142-4 Mar 15 1966.

Descriptors: (*Semiconductors, Luminescence), (*Gallium alloys, Arsenic alloys), Impurities, Tellurium, Doping, Correlation techniques, Microanalysis.

Identifiers: Gallium arsenide.

Measurements of the tellurium concentration by electron probe microanalysis were correlated with the local variations in cathodoluminescence efficiency. Earlier attempts to observe such a correlation failed because the practical limits of detectability in the electron probe microanalyzer are of the same order as the solubility limit of Te in GaAs. (Author)

AD-640 920 **Field 20L, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Metals Research Lab.
RESEARCH ON SURFACE PHENOMENA AND DIFFUSION IN SOLIDS.
Annual summary rept. 1 Oct 65-30 Sep 66,
by Paul G. Shewmon. 30 Sep 66, 3p
Contract Nonr-760 (19)

Descriptors: (*Solids, *Adsorption), Diffusion, Surface properties, Copper, Sulfur.

AD-640 993 **Field 20L**
CFSTI Prices: HC$5.00 MF$1.00
South Dakota School of Mines and Technology, Rapid City. Dept. of Physics.
THERMAL CONDUCTIVITY OF PURE AND IMPURE INDIUM ANTIMONIDE AT LOW TEMPERATURES.
Master's thesis,
by Emery J. Stephans. 1 Oct 66, 165p TR-19
Contract Nonr-2964 (01)
Proj. NR-017-208

Descriptors: (*Semiconductors, *Thermal conductivity), (*Indium alloys, *Antimony alloys), Single crystals, Low-temperature research, Carriers (Semiconductors), Phonons, Scattering, Test methods, Thermocouples, Cryogenics, Programming (Computers).

Identifiers: Indium antimonide.

The thermal conductivity of pure and impure InSb was measured in the temperature range 77-300K. The samples were placed between two Armco-iron standards. Copper-constantan thermocouples were attached to the standard-sample-standard combination to monitor temperatures at various points of the sandwich. To increase confidence in the data, the 77-300K range was covered twice for each sample. Computer-assisted data processing was used to reduce the possibility of human error. The thermal conductivity of both samples decreased with increasing temperatures. Values of 1480 mW/cm deg K AT *)K and 174 mW/cm deg K at 303K were determined for the thermal conductivity of the pure InSb sample. Values of 370 mW/cm deg K at 79K and 77 mW/cm deg K at 302K were determined for the thermal conductivity of the impure InSb sample. The thermal conductivity plot for the impure InSb sample was fitted with a theoretical curve calculated on the basis of Holland's modification of the Callaway analysis. The model included boundary scattering, impurity scattering, and phonon-phonon scattering. The magnitude of the electron-phonon scattering term was estimated. Impurity and possibly electron-phonon scattering can be held responsible for the lower thermal conductivity of the impure sample. (Author)

AD-640 999 **Field 20L, 20B**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
REDUCED MANGANESE MOMENT IN MANGANESE CHROMITE,
by K. Dwight, N. Menyuk, and J. Feinleib. 1966, 3p MS-1463
Contract AF 19 (628)-5167, Grant NSF-GP-5037
ESD-TR-66-214
Availability: Published in Journal of Applied Physics v37 n3 p962-3 Mar 1 1966.

Descriptors: (*Manganese, *Magnetic moments), Manganese compounds, Chromium compounds, Magnetic properties, Nuclear magnetic resonance, Neutron diffraction analysis, Nuclear spins, Atomic energy levels, Hyperfine structure.

Identifiers: Magnetic susceptibility, Manganese chromite, Chromites.

The net magnetization, magnetic susceptibility, manganese-55 nuclear magnetic resonance, and neutron-diffraction properties of $MnCr_2O_4$ were reinvestigated. The results are in general agreement with earlier findings. The neutron-diffraction pattern of $MnCr_2O_4$ evidences appreciable deviation from a pure spiral configuration. Furthermore, the susceptibility data indicate that the Mn (++)ions possess a reduced magnetic moment of about 4.3 micro B rather than the previously assumed value of 5.0 micro B. Given the hypothesis of an admixture of quartet states with quenched orbital momentum into the 6S free-ion ground state, the reduced value of the 55Mn hyperfine field observed in manganese chromite is consistent with this low value for the manganese moment. The interpretation of the NMR result in terms of a ferrimagnetic spiral ground-state spin configuration remains essentially unchanged, a manganese cone angle of about 61 degrees being indicated. The use of 4.3 micro B for the Mn (++) moment improves the agreement between the theoretical and observed neutron-diffraction patterns, but the best fit is still obtained with a much smaller value for this cone angle, namely 33 degrees. Within the spiral model, the observed magnetic-diffraction intensities are incompatible with the larger cone angle; the NMR findings are incompatible with the smaller. Other discrepancies are also discussed. (Author)

AD-641 004 **Field 20L**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
POLARON INDUCED ANOMALIES IN THE INTERBAND MAGNETOABSORPTION OF InSb,
by E. J. Johnson, and D. M. Larsen. 14 Feb 66, 6p JA-2760
Contract AF 19 (628)-5167
ESD-TR-66-389
Availability: Published in Physical Review Letters v16 n15 p655-9 Apr 11, 1966.

Descriptors: (*Indium alloys, Antimony alloys), (*Band theory of solids, Semiconductors), Absorption, Infrared radiation, Magnetic properties, Electrons, Phonons.

Identifiers: Polarons.

Striking anomalies were found in the interband magnetoabsorption of InSb which are believed to constitute the first direct and unambiguous observation of polaron self-energy effects. Examined in detail is the magnetic field dependence of the infrared absorption associated with transitions from the valence band to the n = 1 spin-up conduction-band Landau level. For fields in the range of 30-40 kG, readily discerned was a doublet structure in absorption which cannot be accounted for by the standard theory of interband magnetoabsorption in InSb. Similarly anomalous is the observed variation with field of the intensity and energy of each component of the doublet. Theoretically, polaron effects on the mth conduction-band Landau level, normally small in InSb, are expected to be strongly enhanced when the energy separation between the n = 0 and n = m Landau levels approaches the energy of a longitudinal optical phonon. Detailed analysis indicates that these enhanced polaron effects are responsible for the observed anomalies.

AD-641 036 **Field 20L, 20J, 20C**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Physics.
SPHERICAL IMPURITY IN AN INFINITE SUPERCONDUCTOR,
by Alexander L. Fetter. 26 Jul 65, 18p
Gran AF-AFOSR-130-65
Proj. AF-9767
Task 976701
AFOSR-66-1546
Availability: Published in Physical Review v140 n6A pA1921-36 Dec 13 1965.

Descriptors: (*Superconductors, Impurities), Superconductivity, Particles, Spheres, Scattering, Momentum, Phase shift, Oscillation, Atomic energy levels, Resonance, Wave functions, Green's function, S-matrix.

The modifications in a superconducting medium due to a single, spherically symmetric, nonmagnetic impurity are examined using the BCS theory of superconductivity. The energy spectrum of quasiparticles has both a discrete portion (bound states) and a continuous portion (scattering states). In the scattering region, a given energy corresponds to two distinct momentum states, one above and one below the Fermi level. The calculation of the S matrix for the impurity scattering is thus a problem of two coupled channels. The electron density and the order parameter far from the impurity are evaluated asymptotically in terms of the eigenphase shifts and mixing parameter of the two channels. Two soluble models for the impurity are considered. With a hard-sphere, long-range spatial oscillations are found in the order parameter as well as in the electron density. With a delta-shell potential, a resonant enhancement occurs in the scattering of quasiparticles with momentum near the Fermi momentum. Both the spatial oscillations and the resonant enhancement are expected to appear for more general impurity potentials. (Author)

AD-641 045 **Field 20L**
Not available from CFSTI.
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
THE EFFECT OF DOUBLY IONIZABLE VACANCY ACCEPTORS ON THE CONDUCTIVITY OF DONOR DOPED SEMICONDUCTING COMPOUNDS WITH SPECIAL REFERENCE TO CdTe AND ZnTe.
Revised ed.,
by F. A. Kroger. 17 May 65, 13p
Grant AF-AFOSR-496-65
Proj. AF-4751
AFOSR-66-0527
Revision of manuscript submitted 31 Mar 65.
Availability: Published in Journal of Physics and Chemistry of Solids v26 p1717-26 1965.

Descriptors: (*Semiconductors, Carriers (Semiconductors)), (*Carriers (Semiconductors), Tellurides), (*Cadmium compounds, Tellurides), (*Zinc compounds, Tellurides), Valence, Ionization, Theory, Band theory of solids.

Identifiers: Cadmium telluride, Zinc telluride.

A discussion is given for the effect of doubly ionizable vacancy acceptors on the semiconducting properties of donor doped compound semiconductors. The state during preparation as well as that reached after rapid cooling is discussed. The considerations are applied to CdTe and ZnTe. It is shown that a model proposed for CdTe by de Nobel is consistent with the experimental data available at present. ZnTe is seen to have a strong preference for p-type conduction, but on the basis of the model accepted so far conversion to low resistivity n-type material should be possible at large doping concentrations. High resistivity material, as observed, requires extension of the model. Different conclusions reached by Mandel et al. are traced back to the assignment of an erroneous value to an essential entropy term. (Author)

AD-641 048 **Field 20L**
Not available from CFSTI.
University of Southern California, Los Angeles. Dept. of Physics.
ORTHOGONALIZED-PLANE-WAVE THEORY OF METALLIC BINDING,
by Leonard Kleinman. 5 Jan 66, 11p
Grant AF-AFOSR-496-65
Proj. AF-4751
AFOSR-66-1815
Availability: Published in Physical Review v146 n2 p472-9 Jun 10 1966.

Descriptors: (*Metals, *Molecular association), (*Crystal lattices, Adhesion), (*Aluminum, Molecular association), Chemical bonds, Band theory of solids, Energy, Electrostatics, Kinetic energy, Valence, Matrix algebra, Hartree-Fock approximation.

Identifiers: Orthogonalized-plane-wave theory.

It is demonstrated that the orthogonalized-plane-wave (OPW) method yields binding energies, equilibrium lattice constants, and bulk moduli for metals (aluminum in particular) in as good agreement with experiment as do the cellular methods. The failure of other workers to achieve good agreement is due to the use of incorrect core eigenvalues; one must also be careful not to count certain interactions twice. There appear to be uncertainties in the exchange and correlation contributions to the energy much larger than the error in the calculated binding energy (for either OPW or cellular calculations). The probable effects of eliminating some of these uncertainties with a screened Hartree-Fock crystal calculation are discussed in an appendix. (Author)

AD-641 049 **Field 20L**
Not available from CFSTI.
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
THE ROLE OF THE IONIZATION OF DEFECTS IN CAUSING SYSTEMATIC DIFFERENCES IN THE SEMICONDUCTOR PROPERTIES OF UNDOPED COMPOUNDS.
Revised ed.,
by F. A. Kroger. 17 May 65, 12p
Grant AF-AFOSR-496-65
Proj. AF-4751
AFOSR-66-1067
Revision of manuscript submitted 8 Mar 65.
Availability: Published in Journal of Physics and Chemistry of Solids v26 p1707-15 1965.

Descriptors: (*Semiconductors, Crystal lattice defects), Ionization, Carriers (Semiconductors), Atomic energy levels, Electrical conductance.

Undoped compounds often show either n- or p-type conduction, a variation of the activity of the lattice constituents causing a variation in the concentration of donor or acceptors, but not a change of the conductivity type. Only in a few cases can a transition from n- to p-type be achieved. It is shown that the degree of ionization of the imperfections acting as donors or acceptors is an important factor in deciding the type of atomic imperfection that is predominately formed. The insight gained is used to explain some observed trends in the semiconductor properties of the II-VI and IV-VI compounds. (Author)

AD-641 056 **Field 20L**
Not available from CFSTI.
Rochester Univ., N. Y. Inst. of Optics.
EXCITED STATES OF SOLID Ar:H II. LINE SHAPES AND INTERSTITIAL SITES,
by Thomas H. Keil, and Albert Gold. 1 Jun 65, 7p
Grant AF-AFOSR-236-65
Proj. AF-9767
Task 976702
AFOSR-66-1581
Supported in part by NSF.
Availability: Published in The Physical Review v140 n3A pA906-10 Nov 1 1965.

Descriptors: (*Solidified gases, *Atomic energy levels), (*Argon, Solidified gases), (*Hydrogen, Solidified gases), Electron transitions, Impurities, Line spectrum, Quantum mechanics, Spectra (Infrared), Solid solutions, Crystal lattices.

The line shape of the 1s-2p transitions of substitutional H and D atoms in solid argon was analyzed on the basis of a 'four-mode model.' The impurity is treated as interacting (semiclassically) with a linearly coupled 'breathing mode' and with three localized quadratically coupled modes. A full quantum-mechanical treatment of the latter is essential. The experimentally observed isotope shift of the peak is fitted and part of the isotopic width change accounted for by this model. Local-mode infrared absorptions at 0.033 and 0.023 eV are predicted for Ar:H and Ar:D, respectively. It is shown that the relatively high concentration of H (or D) impurities used (2%) simultaneously accounts for the additional width change and the low-energy tail of the spectrum. Excitation energies for the 1s-2p transitions of H atoms trapped at octahedral or tetrahedral interstitial sites are computed using a tight-binding model which was previously used to predict the excitation energy for the substitutional site. Within computational accuracy the transitions are found to take place at the same energy as that for substitutional atoms. Although it seems unlikely that interstitials are present in Baldini's work (here analyzed), experiments to verify their absence are suggested. Experimental measurement of the concentration dependence of the linewidths and the intensity of the low-energy tail will provide useful checks of the model. (Author)

AD-641 080 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Maryland Univ., College Park. Dept. of Physics and Astronomy.
ELECTRON-PHONON CONTRIBUTION TO ELECTRONIC SPECIFIC HEAT.
Technical rept.,
by S. Maitra, and R. E. Prange. Jun 65, 10p TR-266
Grant AF-AFOSR-62-46
AFOSR-66-1230

Descriptors: (*Specific Heat, Metals), (*Electrons, Specific heat), (*Phonons, Specific heat), Atomic energy levels, Temperature, Mathematical models, Crystals.

Identifiers: Debey characteristic temperature, Fermi surfaces.

The electronic specific heat was calculated as a function of temperature. Although the variation is an order of magnitude greater than would be anticipated on the most naive arguments, it still is very doubtful that a sufficiently accurate measurement can be made in the near future which could verify the predicted effect. (Author)

AD-641 094 **Field 20L, 20J, 20C**
Not available from CFSTI.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
ELECTRON-PHONON RENORMALIZATION EFFECTS IN HIGH MAGNETIC FIELDS. THE de HAAS-Van ALPHEN EFFECT,
by M. Fowler, and R. E. Prange. 17 Mar 65, 16p
Grant AF-AFOSR-735-65
Proj. AF-9761
Task 976101
AFOSR-66-1343
Availability: Published in Physics v1 n6 p315-28 1965.

Descriptors: (*Electrons, *Phonons), (*Field theory, Metallic crystals), Magnetic fields, Cyclotron waves, Perturbation theory, Quantum mechanics, Atomic energy levels, Solid state physics.

Identifiers: de Hass-Van Alphen effect.

When a metal is placed in a sufficiently strong magnetic field, it is to be expected that the effective mass of the electrons due to electron phonon interactions will be modified. The condition that the field will be strong enough to have an effect is that the cyclotron frequency be comparable to phonon frequencies. It is expected that such effects may be observable with experimentally realizable fields in some special cases. We have calculated the amplitude dependence of the de Haas-Van Alphen effect as a function of temperature and magnetic field. This amplitude has been calculated numerically for several cases of interest. It is found that the field effects are rather smooth and depend most directly on the electron self-energy function for pure imaginary values of the frequency. (Author)

AD-641 096 **Field 20L**
Not available from CFSTI.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
TRANSPORT THEORY FOR ELECTRON-PHONON INTERACTIONS IN METALS.
Revised ed.,
by Richard E. Prange, and Leo P. Kadanoff. 13 Jan 64, 17p
Grant AF-AFOSR-735-65
Proj. AF-9761
Task 976101
AFOSR-66-1300
Prepared in cooperation with Illinois Univ., Urbana. Dept. of Physics. Revision of manuscript received 15 Oct 63.
Availability: Published in The Physical Review v134 n3A pA566-80 May 4 1964.

Descriptors: (*Solid state physics, Integral equations), (*Metals, Solid state physics), (*Electrons, Phonons), Atomic energy levels, Equations of motion.

By extending Migdal's approximation for electron-phonon interactions in metals to the nonequilibrium case, it is possible to derive a set of transport equations which are exact to order (m/M) to the 1/2 power. This coupled set of equations for the electron and phonon distribution functions is correct even in the situation in which the electronic excitation spectrum has considerable width and structure so that one might not expect a priori that there would be well-defined quasiparticles. Nonetheless, one of the forms of the electronic transport equation is identical to the transport equation suggested by Landau for the case in which the quasiparticle energy is well defined. The transport equations may be written in two different forms: In the first form the electronic distribution function is labeled by a momentum vector; in the second, the labels are excitation energy and the position on the Fermi surface. Despite the width in the spectrum, the momentum-space form is identical with the Landau quasiparticle theory. The energy space form is slightly simpler because no wave function renormalization constants appear in the definition of the energies or in the scattering matrix elements. In fact, in the case in which there is space dependence but no time dependence this form of the transport equations looks identical to the weak-coupling Boltzmann equations. This identity is used to prove that to the accuracy of the adiabatic approximation the several transport coefficients are completely unchanged by the many-body effects of the electron phonon interaction. (Author)

AD-641 103 **Field 20L, 20M**
Not available from CFSTI.
Rutgers - The State Univ., New Brunswick, N. J. Dept. of Physics.
A DETERMINATION OF THE INTERMOLECULAR POTENTIAL PARAMETERS OF THE INERT GAS SOLIDS FOR THE MODIFIED BUCKINGHAM EXP-6 POTENTIAL.
Interim rept.,
by J. S. Brown. 5 May 65, 7p
Grant AF-AFOSR-726-65
Proj. AF-9761
Task 976101
AFOSR-66-1375
Availability: Published in Canadian Journal of Physics v43 p1831-5 Oct 1965.

Descriptors: (*Solidified gases, Molecular association), (*Helium group gases, Solidified gases), Neon, Argon, Krypton, Xenon, Crystal lattices, Cryogenics, Thermodynamics, Heat of sublimation.

The intermolecular potential parameters of solid Ne, Ar, Kr, and Xe are calculated for a modified Buckingham exp-6 potential using crystal data of the sublimation energy and lattice spacing extrapolated to absolute zero. The parameters epsilon and sigma in the exp-6 potential are compared for selected AN ('all neighbor') models with those calculated by Mason and Rice (J. Chem. Phys v22 p843 1954) from gaseous data. (Author)

AD-641 141 **Field 20L, 7C**
CFSTI Prices: HC$3.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
ORGANIC SEMICONDUCTORS: ANALYTICAL SURVEY.
Rept. no. 2 on ATD work assignment no. 79,
by Serge Markov. 20 Apr 66, 54p ATD-66-49
TT-66-62524
Rept. based on Soviet open-source materials for the period Jan 60-Jun 65. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Semiconductors, Organic materials), (*Polymers, Semiconductors), Vinyl plastics, Nitriles, Electrical properties, Photoconductivity, Polymerization, Molecular structure, Magnetic properties, State-of-the-art reviews, Abstracts, USSR.

Identifiers: Polyvinylenes, Polynitriles, Organic semiconductors.

The first report in this series, available as AD-633 276, was concerned with semiconducting polymers prepared by modification of dielectric polymers. The present report broaches the subject of such polymers prepared from the monomers, specifically, polyvinylenes and polynitriles. Introductory remarks briefly describe the development of Soviet research in the area of the preparation and electrical properties of semiconducting polymers. Included is a table listing materials prepared in Soviet research on polyvinylenes and polynitriles, the preparative routes used, the scientists involved and their associations and the appropriate entry numbers. The Analytical Section contains three parts: A. Polyvinylenes, B. Polynitriles, and C. Polyvinylenepolynitriles. In the Annotated Bibliography the 40 entries are grouped under the same three subject headings as listed above with the following distribution: A — 26 entries, B — 13 entries, and C — 1 entry. Each entry is provided with a short indicative annotation. Appended to the report are the following: 1. List of sources searched; 2. Author index; 3. Association index; and 4. Additional entry. The subject of this survey is basically Soviet research on the electrical properties of organic semiconductors and photoconductors. (Author)

AD-641 153 **Field 20L, 18H**
Not available from CFSTI.
Illinois Univ., Urbana. Dept. of Electrical Engineering.
EFFECTS OF X-RAY IRRADIATION ON THE CHARACTERISTICS OF METAL-OXIDE-SILICON STRUCTURES,
by D. R. Collins, and C. T. Sah. 7 Feb 66, 5p
Grant AF-AFOSR-714-65
Proj. AF-9763
Task 976302
AFOSR-66-1798
Availability: Published in Applied Physics Letters v8 n5 p124-6 Mar 1 1966.

Descriptors: (*Semiconductors, *Radiation damage), X rays, Metals, Oxides, Silicon, Surface properties.

It is known that impurities and radiation have considerable effect on the electrical characteristics of the oxidized silicon surfaces. The effect of impurities in the oxide, particularly the alkali metals, is extremely important in the determination of the operating characteristics and the stability of the metal-oxide-silicon (MOS) structures. Gamma irradiation can also change the capacitance-voltage (CV) characteristics or surface potential (surface energy band bending) of the MOS structures drastically. Likewise, the effects of electron bombardment have been described and were found to be partially reversible by annealing. Evidence is presented in this letter to show that x-rays generated by 10-keV electrons from an electron gun can cause reversible damage both near the oxide-silicon interface and in the bulk silicon of the MOS structures. (Author)

AD-641 163 **Field 20L**
Not available from CFSTI.
Illinois Univ., Urbana. Dept. of Electrical Engineering.
GOLD DIFFUSIVITIES IN SiO2 AND Si USING THE MOS STRUCTURE,
by C. T. Sah, D. R. Collins, and D. K. Schroder. 10 May 66, 4p
Grant AF-AFOSR-714-65
Proj. AF-9763
Task 976302
AFOSR-66-1845
Supported in part by ARPA.
Availability: Published in Applied Physics Letters v8 n12 p323-5 Jun 15 1966.

Descriptors: (*Gold, Diffusion), (*Semiconductors, Gold), (*Silicon, Doping), Silicon compounds, Dioxides, Capacitors, Capacitance, Voltage, Single crystals, Impurities.

Identifiers: Metal oxide semiconductors, Silicon dioxide.

A study is presented of gold diffusion in Si and SiO using the capacitance-voltage curves of MOS capacitors. In addition, the path of gold diffusion is also established by a simple experiment and the gold diffusivities both in Si and in thermally-grown SiO are obtained based on a two-layer diffusion model.

AD-641 185 **Field 20L, 20E**
Not available from CFSTI.
Illinois Univ., Urbana. Dept. of Electrical Engineering.
GROWTH AND DISLOCATION STRUCTURE OF SINGLE-CRYSTAL Ga (As1-xPx),
by C. M. Wolfe, C. J. Nuese, and N. Holonyak, Jr. 13 Apr 65, 14p
Contract AF 19(628)-4337, Grant AF-AFOSR-714-65
Proj. AF-9763
Task 976302
AFOSR-66-1636
Availability: Published in Journal of Applied Physics v36 n12 p3790-801 Dec 1965.

Descriptors: (*Gallium alloys, Single crystals), (*Crystal growth, Gallium alloys), (*Crystal lattice defects, Gallium alloys), Arsenic alloys, Phosphorus alloys, Solid solutions, Whiskers (Crystals), Doping, Crystal structure, Semiconductor devices, Lasers.

Identifiers: Gallium arsenophosphides.

The preparation of single-crystal GaAsP by halide vapor transport is described. That dislocation free GaAsP can be achieve was verified experimentally for whiskers grown by the vapor-liquid-solid method. In the growth of monocrystalline ingots for device purposes, growth mechanics and the resulting crystal habit are strongly influenced by degenerate Zn, Te, and Se doping. Since n-type crystals require higher supersaturations, single-crystal growth is easier to obtain with Zn doping.

The as-grown dislocation structure of ingots with low-index natural facelts was examined by decoration and etching. Typical densities are 5,000 to 1,000,000/sq. cm. From their simple crystallographic orientations different dislocations are identified. Values of mobility and carrier density are evaluated from a device point of view. Laser diodes with threshold currents as low as 3000 A/sq cm at 33.3% GaP were obtained from this material. (Author)

AD-641 206 **Field 20L**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
PHOTOCONDUCTIVITY IN CRYSTALS OF ORGANIC MOLECULES.
Interim rept.,
by Joshua Jortner, and Stuart A. Rice. 1965, 16p
Grant AF-AFOSR-781-65
Proj. AF-9760
Task 976001
AFOSR-66-1451
Availability: Published in Modern Quantum Chemistry pt 3 p235-48 1965.

Descriptors: (*Photoconductivity, Organic compounds), (*Aromatic compounds, Photoconductivity), (*Carriers (Semiconductors), Organic compounds), Crystals, Atomic energy levels, Quantum mechanics, Anthracenes, Photons, Band theory of solids, Molecular orbitals.

Identifiers: Excitons, Organic photoconductors.

A theoretical discussion is given of charge carrier generation in the bulk of molecular crystals of organic molecules, and of carrier mobility in aromatic crystals.

AD-641 222 **Field 20L, 7D**
Not available from CFSTI.
Yale Univ., New Haven, Conn.
GROUND STATE SPLITTING AND ZEEMAN EFFECT IN ERBIUM ETHYLSULPHATE AT 1.6K.
Interim rept.,
by R. G. Wheeler, and J. C. Hill. 28 Jan 66, 5p
Grant AF-AFOSR-873-65
Proj. AF-9763
Task 976302
AFOSR-66-1657
Availability: Published in Physics Letters v20 n5 p496-8 Mar 15 1966.

Descriptors: (*Erbium compounds, *Electron transitions), Atomic energy levels, Spectra (Infrared), Line spectrum, Cryogenics, Metal organic compounds, Sulfites, Single crystals.

Identifiers: Erbium ethyl sulfite.

Transitions have been observed between the Zeeman split Stark components of the ground J-manifold in erbium ethylsulphate at 1.6K. The transitions appear to be primarily magnetic dipole in character. (Author)

AD-641 223 **Field 20L**
Not available from CFSTI.
Yale Univ., New Haven, Conn. Dept. of Physics.
PHONON-COUPLED PAIR SPECTRA OF K2ReCl6 IN SINGLE CRYSTALS OF K2PtCl6,
by Paul B. Dorain, and Robert G. Wheeler. 10 Sep 65, 6p
Grant AF-AFOSR-873-65
Proj. AF-9763
Task 976302
AFOSR-66-1633
Availability: Published in Physical Review Letters v15 n25 p968-70 Dec 20 1965.

Descriptors: (*Rhenium, Absorption spectrum), Potassium compounds, Platinum compounds, Chlorides, Solid solutions, Phonons, Antiferromagnetism, Line spectrum, Wave functions.

Identifiers: Potassium hexachloroplatinate, Potassium hexachlororhenate.

The optical spectra of dilute single crystals of K2PtCl6 containing Re (+4) show absorption peaks which may be assigned to ion pairs of Re (+4) in addition to lines arising from the single ion. The spectrum reported in this note arises from the free-ion transition from 4A2g (gamma-8) to 2T2g (gamma-7) and the associated pair transitions. The results show that (1) the coupling of rhenium pairs in K2PtCl6 crystals in the ground state is antiferromagnetic, and (2) the excited-state coupling parameters are strongly dependent upon the associated vibrational states but are predominantly antiferromagnetic.

AD-641 236 **Field 20L, 7D**
Not available from CFSTI.
Arizona State Univ., Tempe. Dept. of Chemistry.
ON THE PRASEODYMIUM+OXYGEN SYSTEM.
Interim rept.
by B. G. Hyde, D. J. M. Bevan, and L. Eyring.
26 Aug 65, 38p
Grant AF-AFOSR-853-65
Proj. AF-9760
Task 976001
AFOSR-66-1759
Revision of manuscript submitted 12 Nov 64.
Availability: Published in Philosophical Transactions of the Royal Society of London, Series A. Mathematical and Physical Sciences v259 n1106 p583-614 May 19 1966.

Descriptors: (*Praseodymium compounds, Phase studies), Oxygen, Oxides, Solid solutions, Microstructure, Eutectics, Transformations, Solubility, Crystal lattice defects.

Identifiers: Praseodymium oxides.

An isobaric survey of the system praseodymium oxide+oxygen was made at oxygen pressures between 0 and 1 atmosphere and in the temperature range 200C to 1150C. The derived isobaric sections enable a three-dimensional phase diagram (pressure, temperature, composition) to be constructed with considerable certainty and detail for the composition range PrO1.65 to PrO1.84. Reasonable extensions to cover the complete range between the sesquioxide and dioxide are proposed, and a cover the complete range between the sesquioxide and dioxide are proposed, and a projection of the diagram on to the temperature-composition plane is presented. At lower temperatures several discrete, ordered phases of narrow homogeneity range exist. Miscibility gaps with upper consolute points are exeptional; order-disorder peritectoid transformations are common. Hysteresis in phase transformations is confirmed, and the results further demonstrate the existence of metastable states in phase reactions involving an increase in structural order. The appearance of these pseudo-phases and the nature of non-stoichiometry is explained in terms of plausible model invoking microdomain texture in defect solids. This model is believed to be appropriate for other non-stoichiometric systems also. (Author)

AD-641 260 **Field 20L, 20F**
Not available from CFSTI.
University of Southern California, Los Angeles.
CATHODOLUMINESCENCE IN GALLIUM ARSENIDE.
Interim rept.,
by David F. Kyser, and David B. Wittry. 1965, 25p
Grant AF-AFOSR-76-63
Proj. AF-9761
Task 976103
AFOSR-66-1640
Availability: Published in The Electron Microprobe p691-714 1966.

Descriptors: (*Semiconductors, Luminescence), (*Gallium alloys, Arsenic alloys), Carriers (Semiconductors), Recombination reactions, Intensity, Impurities, Crystal lattice defects, Spectra (Infrared).

Identifiers: Gallium arsenide.

The electron probe microanalyzer has been used to study the local intensity fluctuations and spectral distribution of spontaneous recombination radiation from excess carriers produced by the probe in gallium arsenide. Charging effects and the generation and diffusion of excess carriers are discussed. The lifetimes for three nonradiative recombination processes are estimated and compared with the lifetime for direct radiative recombination. Nonradiative recombination appears to be the dominant process in gallium arsenide at 300 degrees K. The dependence of cathodoluminescence on equilibrium carrier concentration and generation rate in the presence of a competing nonradiative process is analyzed. Local fluctuations in the cathodoluminescence intensity have been observed at the position of edge dislocations intersecting a surface, at surface scratches and at p-n junctions. Intensity variations over regions of 10-50 mu have been observed on different surfaces of the same specimen. Specimens of the same carrier concentration may differ in average intensity by as much as two orders of magnitude; for specimens of high efficiency, the intensity varies with carrier concentration and generation rate in a manner expected, if nonradiative recombination dominates. The spectra of cathodoluminescence and injection luminescence from the same diode are compared and discussed. (Author)

AD-641 277 **Field 20L, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
DIFFUSED LAYERS OF SEMICONDUCTIVE COMPOUNDS OF GROUP III AND V,
by K. Gunther. Oct 66, 7p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-1Z624201D466
TT-66-62543, ERDL-T-1877-66
Aufdampfschichten aus Halbleitenden III - VVerbondungen, trans. of die Naturwissenschaften (West Germany) v45 p415-6 1958.

Descriptors: (*Semiconducting films, *Diffusion coating), West Germany, Indium alloys, Antimony alloys, Arsenic alloys, Crystal growth, Hall effect.

With the semiconductive compounds of elements of group III and group V (indicate in ref. 1,) we have available substances characterized by a high Hall coefficient and high electron mobility and consequently particularly suitable for the production of efficient Hall elements, so-called Hall generators. Among these compounds, indium antimonide and arsenide are especially appropriate for this purpose. In order to increase sensitivity as well as for reasons of matching, it is desirable to produce compounds of this type in the form of thin films. If we utilize the method of vacuum diffusion, considerable difficulties result which are based, in the last analysis, on the different vapor pressures of the two individual components. As a consequence, the substances, under heating in vacuum, decompose, diffuse in fractions and give rise to the formation of inhomogeneous films which consist of superposed zones of the individual components.

AD-641 290 **Field 20L**
Not available from CFSTI.
Chicago Univ., Ill. Inst. for the Study of Metals.
A SIZE EFFECT IN NEARLY FREE ELECTRON METALS,
by B. G. Smith. 22 Jul 65, 3p
Grants AF-AFOSR-148-63, NsG-352
Proj. AF-9763
Task 976302
AFOSR-66-1303
Availability: Published in Physics Letters v18 n3 p210-11 Sep 1 1965.

Descriptors: (*Metals, *Solid state physics), Atomic energy levels, Functions, Particle

sizes, Crystal Films, Boundary value problems, Electrons.

In the conventional development of the nearly free electron theory of metals the basis set of free electron eigenfunctions is determined by the assumption of periodic boundary conditions in a lattice of infinite dimensions. This clearly unrealistic choice is justified by the intuitive argument that processes of experimental interest will occur in the bulk of the crystal and should therefore not depend upon the particular boundary conditions employed. Intuition does not support this argument for small crystals, e.g., thin films, for which boundary conditions must be more carefully chosen. In this letter is elaborated a consequence of using stationary instead of travelling wave electronic functions. (Author)

N66-30186 Field 20L
CFSTI Prices HC$1.00 MF$0.50
General Dynamics Corp., San Diego, Calif. Special Nuclear Effects Lab.
RADIATION EFFECTS ON SILICON FOURTH QUARTERLY PROGRESS REPORT, SEP. 25 - DEC. 31, 1965.
by D. P. Snowden, and E. G. Wikner. 10 Jan 66, 14p NASA-CR-76120, GACD-6249-4
Contract NAS7-289

Descriptors: *Radiation effect, *Silicon, *Solar cell, Cell, Conductivity, Effect, Measurement, Microwave, Modification, P type, Radiation, Resonance, Semiconductor, Solar.

For abstract, see STAR 04 17.

N66-30276 Field 20L
CFSTI Prices HC$1.00 MF$0.50
General Dynamics Corp., San Diego, Calif. Special Nuclear Effects Lab.
RADIATION EFFECTS ON SILICON QUARTERLY PROGRESS REPORT NO. 5, JAN. 1 - MAR. 31, 1966.
by H. Horiye, J. A. Naber, and E. G. Wikner. 11 Apr 66, 14p NASA-CR-76119, GACD-6249
Contracts NAS7-289, DA-49-186-AMC-65/X/

Descriptors: *Cryogenic temperature, *Electric conductivity, *Radiation effect, *Room temperature, *Silicon, Annealing, Conductivity, Cryogenic, Degradation, Dependence, Effect, Electric, Electron, Microwave, Purity, Radiation, Resonance, Room, Spin, Temperature, Transient.

For abstract, see STAR 04 17.

N66-30599 Field 20L
CFSTI Prices HC$2.00 MF$0.50
Virginia Univ., Charlottesville. Research Labs. For The Engineering Sciences.
A STUDY OF THIN FILM VACUUM DEPOSITED JUNCTIONS SEMIANNUAL STATUS REPORT, DEC. 5, 1965 - JUN. 5, 1966.
by R. L. Ramey. Jun 66, 45p NASA-CR-76202, EE-4012-106-66U
Grant NSG-340

Descriptors: *Junction, *Thin film, *Vacuum deposition, Barrier, Charge, Deposition, Electrode, Electron, Film, Height, Lattice, Layer, Roughness, Switching, Thickness, Thin, Transport, Tunneling, Vacuum.

For abstract, see STAR 04 17.

N66-30752 Field 20L
CFSTI Prices HC$3.00 MF$0.75
Radio Corp. Of America, Camden, N. J. Defense Electronic Products.
STUDY OF PROPERTIES OF HIGH FIELD SUPERCONDUCTORS, AC FIELD INDUCED FLUX JUMPS TECHNICAL SUMMARY REPORT, 21 JUN. 1965 - 26 APR. 1966.
by D. A. Gandolfo, and C. M. Harper. 26 Apr 66, 71p NASA-CR-76253
Contract NAS8-11272

Descriptors: *Alternating current (ac), *Audiofrequency, *Direct current (dc), *Magnetization, *Niobium alloy, *Titanium alloy, Ac, Alloy, Alternating, Cold, Current, Dc, Direct, Field, Flux, Niobium, Superconductor, Superimposition, Titanium, Work.

For abstract, see STAR 04 17.

N66-30847 Field 20L
CFSTI Prices HC$4.00 MF$0.75
University Of Southern Calif., Los Angeles. Dept. Of Physics.
OPTICAL CONSTANTS OF SILVER AND BARIUM IN THE VACUUM ULTRAVIOLET SPECTRAL REGION.
by E. I. Fisher, I. Fujita, and G. L. Weissler. 1 May 66, 107p NASA-CR-76364, USC-VACUV-108
Grant NSG-178-61

Descriptors: *Barium, *Optical property, *Silver, *Ultraviolet spectrum, *Vacuum ultraviolet, Constant, Detection, Equipment, Film, Index, Light, Measurement, Monochromator, Optical, Property, Reflectometer, Refraction, Source, Spectrum, Ultraviolet, Vacuum.

For abstract, see STAR 04 17.

N66-31366 Field 20L
CFSTI Prices HC$2.00 MF$0.50
Melpar, Inc., Falls Church, Va.
AMORPHOUS SEMICONDUCTOR SEVENTH QUARTERLY REPORT, 3 FEB. - 2 MAY 1966.
by W. HIZimmerman. 1966, 26p NASA-CR-76387
Contract NASW-934

Descriptors : *Absorption spectrum, Boron, *Semiconductor, *Thin film, Absorption, Amorphous, Film, Germanium, Index, Refraction, Silicon, Spectrum, Structure, Thin.

For abstract, see STAR 04 17.

N66-31369 Field 20L
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill.
S- D EXCHANGE MODEL OF ZERO-BIAS TUNNELING ANOMALIES.
by J. Appelbaum. 5, 18p NASA-CR-76390
Grant NSG-352

Descriptors: *Anomaly, *Mathematical model, *P-n junction, *Tunneling, Bias, Conductance, Current, Electron, Exchange, Impurity, Low temperature, Magnetic, Mathematics, Metal, Model, Oxide, Scattering, Spin, Zero.

For abstract, see STAR 04 17.

N66-31373 Field 20L
CFSTI Prices HC$2.00 MF$0.50
Stanford Univ., Calif. Solid-state Electronics Labs.
FUNDAMENTAL STUDIES OF THE METALLURGICAL, ELECTRICAL, AND OPTICAL PROPERTIES OF GALLIUM PHOSPHIDE QUARTERLY PROGRESS REPORT, APR. 1 - JUN. 30, 1966.
by G. L. Pearson. 1966, 28p NASA-CR-76395
Grant NSG-555

Descriptors: *Electric property, *Gallium phosphide, *Optical property, Chemical, Cobalt, Crystal, Diffusion, Electric, Electronics, Gallium, Impurity, Metallurgy, Optical, Phosphide, Property, Semiconductor, Solid, State, Structure, Thermodynamic, Zinc.

For abstract, see STAR 04 17.

N66-32109 Field 20L
CFSTI Prices HC$2.00 MF$0.50
Carnegie Inst. Of Tech., Pittsburgh, Pa.
EPITAXIAL GROWTH OF GALLIUM ARSENIDE WITH AMMONIUM HALIDES AS TRANSPORTING AGENTS)
by H. B. Kim, and R. L. Longini. 1964, 41p NASA-CR76429
Contract NAS8-5269

Descriptors: *Ammonium compound, *Crystal growth, *Epitaxial deposition, *Gallium arsenide, Agent, Ammonium, Arsenide, Compound, Crystal, Deposition, Epitaxy, Gallium, Growth, Halide, Transport, Vapor.

For abstract, see STAR 04 17.

N66-32259 Field 20L
CFSTI Prices HC$1.00 MF$0.50
Rice Inst., Houston, Tex. Dept. Of Electrical Engineering.
EFFECT OF DIMENSIONS ON THE EFFICIENCY OF RADIANT ENERGY CELLS.
by G. C. Jain, and S.-S. Li. 1966, 18p NASA-CR-76719
Grant NSG-6
Presented At The Internatl. Congr. And Exhibition Of Electron. And Atomic Energy, Rome, 15-26 Jun. 1966

Descriptors: *Energy conversion efficiency, *Germanium, *P-n junction, *Photovoltaic conversion, *Semiconductor, Absorption, Cell, Coefficient, Conversion, Diffusion, Dimension, Effect, Efficiency, Electric, Energy, Field, Layer, Optimization, Photon, Photovoltaic, Quantum, Radiance, Thickness.

For abstract, see STAR 04 17.

N66-32286 Field 20L
CFSTI rices HC$2.50 MF$0.75
Westinghouse Electric Corp., Baltimore, Md. Aerospace Div.
SEMICONDUCTOR WAFER IMPROVEMENT THROUGH PHOTOENGRAVING FINAL REPORT, 17 JUN. 1964 - 11 JAN. 1965.
by C. J. Taylor. 1965, 69p NASA-CR-76745
Contract NAS5-2755

Descriptors: *Adhesion, *Photoengraving, *Semiconductor device, *Silicon, *Wafer, Cleaning, Device, Film, Humidity, Metal, Oxide, Photoresistivity, Physics, Pinhole, Resistance, Semiconductor, Solid, State, Steam, Surface, Thermal, Thin.

For abstract, see STAR 04 17.

N66-32299 Field 20L
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
INVESTIGATION OF A PROPOSED TECHNIQUE FOR MEASUREMENTS OF DIELECTRIC CONSTANTS AND LOSSES AT V-BAND USING THE FABRY- PEROT PRINCIPLE.
by C. A. Balanis. Aug 66, 92p NASA-TM-X-57770

Descriptors: *Dielectric constant, *Electric field strength, *Fabry-perot interferometer, *V-band, Cavity, Constant, Dielectric, Electric, Field, High q, High sensitivity, Loss, Microwave, Plexiglas, Polystyrene, Resonance, Strength, Tangent, Teflon.

For abstract, see STAR 04 17.

N66-32319 Field 20L
CFSTI Prices HC$3.00 MF$0.75
France. Ministere De L Air, Paris.
TUNNEL EFFECT IN THE ESAKI DIODES. PARTICULAR RESEARCH ON THE PHYSICAL PHENOMENA LINKED TO THE OPERATION OF THE GERMANIUM DIODES AT LOW TEMPERATURES.

Effet Tunnel Dans Les Diodes Esaki. Recherches riculieres Sur Les Phenomenes Physiques Lies Au Fonctionnement Des Diodes De Germanium Aux Basses Temperatures
by P. Andre. 1966. 116p NT-150
1966 116 P Refs In French

Descriptors: *Esaki diode, *Germanium, *Tunnel, Antimonide, Band, Electric, Field, France, Gallium, Low temperature, Noise, Physical.

For abstract, see STAR 04 17.

N66-32427 **Field 20L**
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Dept. Of Physics And Inst. Of Metals.
ELECTRONIC SPECTRUM OF CRYSTALLINE ANTIMONY.
by P. J. Lin, and J. C. Phillips. 1965. 45p NASA-CR-76754
Grant NSG-352

Descriptors: *Antimony, *Electron spectrum, *Electronic structure, Arsenic, Bismuth, Crystal, Effect, Electron, Electronic, Energy, Level, Method, Orbit, Oscillator, Polarization, Potential, Prediction, Semiconductor, Spectrum, Spin, Splitting, Strength, Structure.

For abstract, see STAR 04 17.

N66-32431 **Field 20L**
CFSTI Prices HC$2.00 MF$0.50
Carnegie Inst. Of Tech., Pittsburgh, Pa. Dept. Of Electrical Engineering.
THE NATURE OF A MOVING DISLOCATION BAND FOUND WHEN ZINC IS DIFFUSED INTO GALLIUM ARSENIDE.
by H. B. Kim, and R. L. Longini. 1965. 37p
NASA-CR-76755
Contract NAS8-5269

Descriptors: *Diffusion, *Dislocation, *Gallium arsenide, *P-n junction, *Zinc, Arsenide, Band, Concentration, Density, Etching, Gallium, Interstitial, Model, Moving, Pit, Substitution.

For abstract, see STAR 04 17

N66-32436 **Field 20L**
CFSTI Prices HC$2.50 MF$0.75
Chicago Univ., Ill. Inst. For The Study Of Metals.
EXCITON AND IMPURITY STATES IN RARE GAS SOLIDS.
by J. Hermanson. 1965. 62p NASA-CR-76760
Grant NSG-352

Descriptors: *Excited state, *Impurity, *Krypton, *Rare gas, *Xenon, Crystal, Dielectric, Electron, Element, Energy, Excitation, Exciton, Gas, Hole, Interaction, Kinetic, Matrix, Phase, Potential, Rare, Screening, Solid, State.

For abstract, see STAR 04 17.

N66-37118 **Field 20L**
CFSTI Prices HC$3.00 MF$0.75
Massachusetts Inst. Of Tech., Cambridge. Electronic Systems Lab.
ELECTRICAL CONDUCTION PROCESSES IN THIN FILMS OF CADMIUM SULFIDE.
by J. G. Gottling, and W. S. Nicol. Jun 66. 99p
NASA-CR-78019, ESL-R-272
Grant NSG-496

Descriptors: *Cadmium sulfide, *Electric conductivity, *Thin film, Cadmium, Conduction, Current, Device, Electric, Emission, Evaporation, Film, Optics, Photoconductivity, Property, Solid, State, Sulfide, Thermal, Thin, Vacuum.

For abstract, see STAR 04 22.

N66-37313 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill. Dept. Of Physics.
SPIN WAVES IN FERROMAGNETIC METALS AND THE DYNAMICAL FORM OF THE LANDAU QUASI-PARTICLE THEORY.
by M. H. Cohen, and D. R. Penn. 1966. 24p
NASA-CR-78249
Grant NSG-352
Prepared In Cooperation With Argonne Natl. Lab.

Descriptors: *Hamiltonian, *Magnetic metal, *Spin wave, Dynamic, Ferromagnetism, Form, Landau factor, Mechanics, Metal, Quantum, Quasi-particle, Theory.

For abstract, see STAR 04 22.

N66-37580 **Field 20L**
CFSTI Prices HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
PHOTOCONDUCTIVITY AND PHOTOTROPY IN NON-CRYSTALLINE SOLIDS.
by J. D. Mackenzie. 1966. 47p NASA-CR-78310
Grant NSG-100-60
Presented At The Intern. Conf. On Radiation Effects On Solids, Cairo, Sep. 1966

Descriptors: *Glass, *Photoconductivity, *Phototropism, *Selenium, Amorphous, Chalcogenide, Crystalline, Halide, Inorganic, Semiconductor, Silver, Solid, Structure.

For abstract, see STAR 04 22.

PB-173 233 **Field 20L**
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE DES DISLOCATIONS HELICOIDALES (Contribution to the Study of Screw Dislocations).
Doctoral thesis,
by Jean Grilhe. Mar 65. 67p CEA-R-2916
Text in French; Attached summary in English.

Descriptors: (*Crystal lattice defects, Helixes), Stability, Mechanical properties, Geometry, Theory, France.

The aim of the work is to study the germination, growth and properties of screw dislocations. A review is given of the main experimental results obtained by various authors (observations of screws by Amelinckx and Bontinck in ionic crystals, by Dash in silicon crystals and by Thomas and Whelan in aluminium based alloys). The characteristic geometry of screws and the various methods used for calculating the energy of a dislocation is then considered. Problems involving only slip of the screw around its cylinder are studied. Consideration is given to problem of the stability when the dislocation can climb by absorption or emission of vacancies. A germination model is advanced for the screws: since the vacancies are not absorbed by the screw dislocations, they form clusters which take up a spiral form. The formation of these spirals is studied from the geometrical point of view in face-centred cubic systems. The results are used for studying the growth of the spirals.

AD-640 664 **See Field 20B**

AD-640 709 **See Field 20B**

AD-640 805 **See Field 7D**

AD-640 894 **See Field 9A**

AD-641 000 **See Field 20B**

AD-641 009 **See Field 7B**

AD-641 046 **See Field 20H**

AD-641 097 **See Field 12A**

AD-641 105 **See Field 13A**

AD-641 157 **See Field 11F**

AD-641 158 **See Field 9A**

AD-641 198 **See Field 20B**

AD-641 209 **See Field 7D**

AD-641 210 **See Field 7D**

AD-641 221 **See Field 20B**

AD-641 224 **See Field 20F**

AD-641 231 **See Field 20C**

AD-641 234 **See Field 20K**

AD-641 293 **See Field 7D**

20M. THERMODYNAMICS

AD-640 608 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
STUDY OF THE HEATING OF SOLIDS BY CONVECTIVE AND RADIANT FLUXES.
by V. V. Ivanov, and A. V. Furman. 17 Aug 66. 11p TG-230-T498
Contract NOw-62-0604
TT-66-62471
Trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport n1 p131-4 1966.

Descriptors: (*Solids, Heating), Convection (Heat transfer), Thermal conductivity, USSR, Thermodynamics.

An approximate method is described for calculating the temperature field in solids heated by convection and radiation when the thermophysical properties of the substance (heat capacity and conductivity) depend on the temperature. (Author)

AD-640 872 **Field 20M, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Princeton Univ., N. J. Gas Dynamics Lab.
KINETIC THEORY OF THERMAL CONDUCTION IN A COLLISIONLESS GAS.
Interim rept.,
by Yau Wu. Jun 66. 34p Rept. no. 746
Contract AF 49 (638)-1271, Grant NSF-GK-59
Proj. AF-7064
ARL-66-0114

Descriptors: (*Thermal conductivity, Kinetic theory), (*Gas flow, Thermal conductivity), Superaerodynamics.

The kinetic theory of thermal conduction in a collisionless gas in an arbitrary closed system was developed. The pressure, density, temperature and isotropicity (I) in the system are not uniformly distributed in general, but PI/square root of T and n (square root of TI) are invariants throughout the whole region according to the revised law of thermal transpiration developed recently by Wu. The thermal conductance was defined as a matrix in a multicomponent system. It is not only linearly dependent on the mean density in the system at a given temperature distribution on the boundary, but is also dependent on the geometry and the reflection law on the boundary of the system. Several geometries were considered, such as parallel plates, triangular parallel plates, cubes, polygons, polygonal parallel plates and others. A similarity law was established showing equivalence among the systems of different geometries. (Author)

AD-641 155 **Field 20M, 12A**
Not available from CFSTI.
Frank J. Seiler Research Lab., Air Force Academy, Colo.

DIFFERENTIAL ANALYZER SOLUTION OF THE DIFFUSION EQUATION WITH A FREE BOUNDARY.
Final scientific rept.,
by Orlando J. Manci, Jr. Oct 65, 11p SRL-65-0010
Proj. 7904
Availability: Published in Technique de calcul analogique et numerique en aeronautique p474-9 1965.

Descriptors: (*Convection (Heat transfer), Solids), (*Analog computers, *Partial differential equations), Ablation, Diffusion, Freezing.

The paper reports work on the solution of the problem of heat convection in a solid which is freezing. The problem is non-linear so the general solution is not in the offing. The problem is of two parts, ablative and non-ablative. The paper investigates the ablative case but the solution could be extended to the non-ablative. The temperature distribution within and the position of the boundary of a semi-infinite slab subjected to a heat flux is obtained by means of the electronic differential analyzer. The problem is rendered non-dimensional by a new set of dimensionless numbers; the semi-infinite slab is treated by a transformation which reduces it to the unit interval. (Author)

AD-641 263 **Field 20M**
Not available from CFSTI.
Dartmouth Coll., Hanover, N. H.
GRAVITATIONAL FLOW OF SUPERFLUID HELIUM AT 0.45K.
by J. N. Kidder, and H. A. Blackstead. 1965, 6p
Grant AF-AFOSR-74-63
Proj. AF-9767
Task 976701
AFOSR-66-1542
Availability: Published in Low Temperature Physics-LT9 (PtA) p331-4 1965.

Descriptors: (*Helium, Superfluidity), Cryogenics, Liquefied gases, Fluid flow, Gravity.

Liquid-helium flow at a temperature well below 1K has been studied to investigate the interaction between the liquid and the capillary walls. The observed pressure gradients at velocities greater than the critical value are similar in form to other measurements of pure superfluid flow at higher temperatures. A simple gravitational flow technique has been used, the fluid being mechanically displaced to induce flow through a round capillary between two concentric reservoirs. The experiments have been done at 0.45K, where the relative normal fluid density is 0.000003. Calculations indicate that normal-fluid viscosity cannot account for the observed pressure gradients. (Author)

NBS-TN-343 **Field 20M**
CFSTI Prices: HC$0.15 MF$0.50
National Bureau of Standards, Washington, D. C. Inst. for Materials Research.
TEMPERATURE-ENTROPY DIAGRAM FOR PARAHYDROGEN TRIPLE-POINT REGION.
Technical note,
by C. F. Sindt, and D. B. Mann. 22 Jun 66, 10p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402 $0.15

Descriptors: (*Hydrogen, Phase studies), (*Liquefied gases, Hydrogen), (*Solidified gases, Hydrogen), Cryogenics, Nuclear spins, Enthalpy, Entropy, Pressure, Volume, Temperature, Vapors.

Identifiers: Parahydrogen.

The three-phase region at and near the triple point of parahydrogen is presented on the graphical coordinates of temperature and entropy. Isobars from 10 mm Hg to 340 atmospheres, temperatures from 11K to 23K and specific volumes covering the range of from 10.5 cc/gm to 15,000 cc/gm are included. The energy base of enthalpy and entropy are consistent with previous data. (Author)

N66-30176 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
ANALYTICAL DETERMINATION OF THE EFFECT OF THERMAL PROPERTY VARIATIONS ON THE PERFORMANCE OF A CHARRING ABLATOR.
by W. D. Brewer, and C. M. Pittman. Jul 66, 32p NASA-TN-D-3486

Descriptors: *Ablating material, *Char, *Thermal property, Calculation, Conductivity, Effect, Gas, Heat, Interface, Performance, Pyrolysis, Recession, Specific, Surface, Temperature, Thermal, Variation.

For abstract, see STAR 04 17.

N66-30856 **Field 20M**
CFSTI Prices HC$5.00 MF$1.00
Purdue Univ., Lafayette, Ind. Jet Propulsion Center.
TRANSPIRATION COOLING - ITS THEORY AND APPLICATION.
by J. B. Kelley, and M. R. Lecuyer. Jun 66, 180p NASA-CR-76367, TM-66-5
Grant NSG-592

Descriptors: *Transpiration cooling, *Turbulent boundary layer, Application, Boundary, Coefficient, Cooling, Correlation, Flow, Friction, Heat, Injection, Layer, Mass, Material, Porosity, Prediction, Rate, Skin, Surface, Theory, Transfer, Transpiration, Turbulent.

For abstract, see STAR 04 17.

N66-31346 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
ANALYTICAL STUDY OF DIFFUSION-CONTROLLED CHAR OXIDATION AND ITS EFFECT ON STEADY-STATE ABLATION OF PLASTIC MATERIALS.
by G. D. Walberg. Jul 66, 45p NASA-TR-R-242

Descriptors: *Ablation, *Char, *Oxidation, *Plastic material, *Steady state, Analysis, Boundary, Carbon, Control, Enthalpy, Flow, Gas, Hydrogen, Layer, Material, Nitrogen, Oxygen, Plastic, Pyrolysis, Rate, Reaction, State, Steady, Surface.

For abstract, see STAR 04 17.

N66-31384 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
Litton Systems, Inc., Minneapolis, Minn. Applied Science Div.
STUDY OF SUBMINATURE TOTAL TEMPERATURE PROBES FINAL REPORT, 25 JUN. 1965 - 25 MAR. 1966.
by A. R. Hanson, and R. E. Larson. 7 Jul 66, 44p NASA-CR-76412
Contract NAS8-20204
Its Rept.-2980

Descriptors: *Boundary layer, *High temperature research, *Temperature probe, Boundary, Calibration, High pressure, High temperature, Layer, Probe, Research, Subminiaturization, Temperature, Testing, Total, Tunnel, Wind.

For abstract, see STAR 04 17.

N66-31671 **Field 20M**
CFSTI Prices HC$6.75 MF$3.25
Argonne National Lab., Ill.
PROCEEDINGS OF THE CONFERENCE ON APPLICATION OF HIGH TEMPERATURE INSTRUMENTATION TO LIQUID- METAL EXPERIMENTS.
1965, 667p NASA-CR-76450, ANL-7100
Contract W-31-109-ENG-38
Conf. Held 28-29 Sep. 1965, Sponsored Jointly By Nasa And Aec

Descriptors: *Boiling, *Conference, *Forced convection, *Heat transfer, *High temperature research, *Instrumentation, *Liquid metal, *Void fraction, Alkali, Bearing, Convection, Film, Flow, Forced, Fraction, High temperature, Journal, Liquid, Loop, Metal, Phase, Potassium, Research, Sodium, Thermodynamics, Two, Void.

For abstract, see STAR 04 17.

N66-31701 **Field 20M**
CFSTI Prices HC$3.25 MF$1.00
Aerojet-general Aerometrics, San Ramon, Calif.
DEVICE FOR MEASURING THE TEMPERATURE OF LIQUID AND GASEOUS HYDROGEN FINAL REPORT.
by H. C. Chandon, and A. R. Larson. Apr 66, 151p NASA-CR-76417
Contract NAS8-11862
Its Rept.-0700-1161

Descriptors: *Cryogenic temperature, *Liquid hydrogen, *Temperature transducer, Accuracy, Cryogenic, Device, Fabrication, Fast, Gas, Hydrogen, Liquid, Measurement, Response, Sensitivity, Temperature, Testing, Transducer.

For abstract, see STAR 04 17.

N66-31856 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
Atlantic Research Corp., Alexandria, Va.
A THERMISTOR ARRANGEMENT TO IMPROVE TEMPERATURE MEASUREMENTS AT HIGH ALTITUDES.
by W. A. Drews. Aug 66, 53p NASA-CR-533
Contract NAS1-1611

Descriptors: *Structural design, *Temperature measurement, *Thermistor, Aerodynamic, Bead, Configuration, Design, Device, Electron, Error, Heating, High altitude, Immersion, Isolation, Measurement, Mounting, Physical, Sensor, Structure, Temperature, Thermal, Thermometer.

For abstract, see STAR 04 17.

N66631858 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EXPLORATORY INVESTIGATION OF THE EFFECT OF NYLON GRAIN SIZE ON ABLATION OF PHENOLIC NYLON.
by R. K. Crouch, and G. D. Walberg. Aug 66, 40p NASA-TN-D-3465

Descriptors: *Ablation, *Material testing, *Nylon, Air, Char, Effect, Flux, Grain, Heat, Layer, Material, Nitrogen, Oxidation, Pyrolysis, Reentry, Size, Testing, Trajectory.

For abstract, see STAR 04 17.

N66-31939 **Field 20M**
CFSTI Prices HC$3.00 MF$1.00
Pratt And Whitney Aircraft, East Hartford, Conn.
VAPOR-CHAMBER FIN STUDIES THIRD QUARTERLY REPORT, 1 DEC. 1965 - 20 FEB. 1966.
by B. H. Hilton, L. S. Langston, and A. Sherman. Apr 66, 131p NASA-CR-54989, PNA-2818
Contract NAS3-7622

Descriptors: *Chamber, *Porous material, *Space radiator, Boiling, Capillary, Film, Fin, Flat, Freon, Friction, Heat transfer, Material, Metal, Permeability, Plate, Porosity, Radiator, Space, Vapor, Water, Wick.

For abstract, see STAR 04 17.

N66-32143 Field 20M
CFSTI Prices HC$1.00 MF$0.50
Princeton Univ., N. J.
ON THE THERMODYNAMICS AND APPROXIMATION THEORY OF VISCOELASTIC MATERIALS.
by D. C. Leigh. 1966. 18p NASA-CR-76559
Grant NSG-664
Submitted For Publication

Descriptors: *Approximation method, *Thermodynamic property, *Viscoelasticity, Approximation, Coefficient, Equation, Fading, First, Fluid, Material, Memory, Method, Order, Property, Restriction, Second, Theory, Thermodynamic, Zero.

For abstract, see STAR 04 17.

N66-32288 Field 20M
CFSTI Prices HC$1.00 MF$0.50
Case Inst. Of Tech., Cleveland, Ohio. Polymer Science Group.
CONSTRUCTION OF TORSIONAL PENDULUM FOR CRYOGENIC TEMPERATURES, PART IV STATUS REPORT, OCT. 31, 1965 - APR. 30, 1966.
by E. Baer, and I. Kuriyama. 1966, 14p NASA-CR-76739
Contract NGR-36-003-054

Descriptors: *Cryogenic temperature, *Pendulum apparatus, *Polymer, Apparatus, Chamber, Construction, Cryogenic, Cryostat, Design, Measurement, Optical, Oscillation, Pendulum, Preparation, Recording, Relaxation, Sample, System, Temperature, Torsion, Vacuum.

For abstract, see STAR 04 17.

N66-32438 Field 20M
CFSTI Prices HC$2.00 MF$0.50
Illinois Univ., Urbana.
THEORETICAL STUDY OF RADIANT HEAT EXCHANGE FOR NON-GRAY NON-DIFFUSE SURFACES IN A SPACE ENVIRONMENT SEMI-ANNUAL STATUS REPORT NO. 3, FEB. - JUL. 1966.
by R. G. Hering, A. F. Houchens, and T. F. Smith. 1 Jul 66, 37p NASA-CR-76764
Contract NGR-14-005-036

Descriptors: *Heat exchanger, *Nongray atmosphere, *Radiant heating, *Space environment, Atmosphere, Diffuse, Environment, Equation, Equilibrium, Exchanger, Heat, Heat transfer, Heating, Integral, Nongray, Radiance, Space, Surface, Temperature.

For abstract, see STAR 04 17.

N66-32554 Field 20M
CFSTI Prices HC$3.00 MF$0.75
Case Inst. Of Tech., Cleveland, Ohio. Engineering Div.
AN EXPERIMENTAL STUDY OF MELTING WAVE BEHAVIOR.
by W. H. Edling, and S. Ostrach. Jun 66, 110p NASA-CR-76485, FTAS/TR-66-7
Grant NSG-391

Descriptos: *Flat plate, *Melting, *Wave motion, Ablation, Air, Bath, Behavior, Cooling, Flat, Heating, Level, Motion, Parallel, Plate, Propagation, Stream, Suspension, Turbulence, Water, Wave.

For abstract, see STAR 04 17.

N66-32675 Field 20M
CFSTI Prices HC$1.00 MF$0.50
Union Carbide Corp., Tonawanda, N. Y. Linde Div.
CRYOPUMPING-CRYOSORPTION ARRAY SYSTEM FOR A 3 FOOT TIMES 3 FOOT VACUUM FACILITY FINAL REPORT.
May 66, 23p NASA-CR-76835
Contract NAS5-5881

Descriptors: *Cryopumping, *Function test, *Vacuum pump, Contamination, Cryosorption, Function, Gas, Helium, Hydrogen, Mass, Performance, Pump, Spectrometer, Speed, Test, Thermal, Vacuum.

For abstract, see STAR 04 17.

N66-36426 Field 20M
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
RADIATIVE INTERACTIONS BETWEEN ABSORBING- EMITTING AND FLOWING MEDIA WITH INTERNAL ENERGY GENERATION.
by J. R. Howell. Sep 66, 31p NASA-TN-D-3614
Contract 129-01-09-09-22

Descriptors: *Energy exchange, *Radiation emission, *Thermal radiation, Absorption, Analysis, Coefficient, Diffusion, Emission, Energy, Flow, Flux, Generation, Interaction, Internal, Medium, Monte carlo method, Parameter, Radiation, Rate.

For abstract, see STAR 04 22.

N66-37027 Field 20M
CFSTI Prices HC$2.50 MF$0.75
Lockheed Missiles And Space Co., Palo Alto, Calif.
CONVECTIVE AND RADIATIVE HEAT TRANSFER DURING SUPERORBITAL ENTRY.
by H. Hoshizaki, and K. H. Wilson. Sep 66, 69p NASA-CR-584
Contract NAS7-295

Descriptors: *Convective heat transfer, *Orbital velocity, *Planetary atmosphere, *Radiative heat transfer, *Reentry vehicle, Absorption, Atmosphere, Blunt, Body, Convection, Cooling, Coupling, Effect, Emission, Entry, Heat transfer, Injection, Mass, Orbital, Planetary, Radiation, Space vehicle, Vehicle, Velocity.

For abstract, see STAR 04 22.

N66-37045 Field 20M
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
SHADOW SHIELD EXPERIMENTAL STUDIES.
by E. R. Bartoo, R. J. Boyle, and R. H. Knoll. 1966, 26p NASA-TM-X-52238
Presented At Conf. On Long-term Cyro-propellant Storage In Space, Huntsville, Ala., 12-13 Oct. 1966,

Descriptors: *Flat plate, *Heat shield, *Thermal radiation, Conduction, Flat, Heat, Lateral, Plate, Property, Radiation, Shield, Spacing, Surface, Thermal.

For abstract, see STAR 04 22.

N66-37048 Field 20M
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THERMOPHYSICS RESEARCH AT MSFC RESEARCH ACHIEVEMENTS REVIEW, SERIES NO. 2.
1965, 42p NASA-TM-X-53490

Descriptors: *Computer program, *Infrared radiation, *Space environment, *Temperature control, *Thermal environment, *Thermophysics, Coating, Computer, Control, Effect, Emissivity, Environment, Experiment, Flight, Infrared, Measurement, Program, Property, Radiation, Research, Solid, Space, Surface, Temperature, Thermal.

For abstract, see STAR 04 22.

N66-37147 Field 20M
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF SUBCOOLING AND GRAVITY LEVEL ON BOILING IN THE DISCRETE BUBBLE REGION.
by J. C. Aydelott, and T. H. Cochran. Sep 66, 41p NASA-TN-D-3449
Contract 124-09-03-01-22
Film Supplement Number C-246 To This Report Is Available On Loan From Lewis Res. Center

Descriptors: *Boiling, *Flat surface, *Gravity, *Heat flux, *Subcooling, Bubble, Buoyancy, Effect, Flat, Flux, Heat, Horizontal, Level, Pressure, Surface, Water, Zero.

For abstract, see STAR 04 22.

N66-37154 Field 20M
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A NEW DESIGN APPROACH FOR WIDE-RANGE TEMPERATURE MONITORING AND COMPENSATING NETWORKS IN SCIENTIFIC SATELLITES.
by W. R. Crockett. Oct 66, 20p NASA-TN-D-3617

Descriptors: *Mathematical model, *Scientific satellite, *Thermistor, Circuit, Compensation, Design, Geophysics, Mathematics, Model, Network, Radiosonde, Satellite, Science, Temperature.

For abstract, see STAR 04 22.

N66-37277 Field 20M
CFSTI Prices HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile And Space Systems Div.
THERMAL ABSORPTION IN SEEDED GRASS SEMIANNUAL REPORT.
by V. C. Burkig. May 66, 30p NASA-CR-78152, DAC-59208
Contract NASW-1310

Descriptors: *Helium, *Particle cloud, *Seeding, *Temperature measurement, *Thermal absorption, Absorption, Carbide, Cloud, Dispersion, Graphite, Iron, Measurement, Particle, Radiation, Tantalum, Temperature, Thermal, Tungsten.

For abstract, see STAR 04 22.

N66-37293 Field 20M
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
THE EFFECT OF PROTUBERANCES, CAVITIES, AND ANGLE OF ATTACK ON THE WIND-TUNNEL PRESSURE AND HEAT-TRANSFER DISTRIBUTION FOR THE APOLLO COMMAND MODULE.
by J. J. Bertin. Oct 66, 58p NASA-TM-X-1243

Descriptors: *Angle of attack, *Apollo spacecraft, *Command module, Cavity, Command, Dimensional, Distribution, Flow, Heat transfer, Heating, Module, Pressure, Protuberance, Rate, Tunnel, Two, Wind.

For abstract, see STAR 04 22.

N66-37302 Field 20M
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF ONE-DIMENSIONAL AND TWO- DIMENSIONAL HEAT-TRANSFER CALCULATIONS IN CENTRAL FIN-TUBE RADIATORS.
by E. C. Bittner, E. L. Sprague, and N. O. Stock-

man. Oct 66, 31p NASA-TN-D-3645
Contract 120-27-04-36-22

Descriptors: *Heat transfer, *Numerical analysis, *Radiator, Analysis, Body, Calculation, Central, Cross section, Dimensional, Equation, Fin, Gray, Heat, Liner, Numerical, One, Panel, Radiance, Rejection, Tube, Two.

For abstract, see STAR 04 22.

N66-37325 **Field 20M**
CFSTI Prices HC$4.00 MF$1.00
United Nuclear Corp., White Plains, N. Y. Development Div.
HYDROGEN THERMAL CONDUCTIVITY AT TEMPERATURES FROM 2000 TO 4000 DEG F FINAL REPORT.
by T. D. Hawkins, S. C. Hyman, S. L. Israel, and R. T. Salter. 14 Apr 64, 132p NASA-CR-787, UNC-5082
Contract NAS3-3205

Descriptors: *Hydrogen, *Thermal conductor, Conductivity, Conductor, Current, Gas, High frequency, Induction, Measurement, Porosity, Pressurization, Temperature, Thermal, Tungsten.

For abstract, see STAR 04 22.

N66-37518 **Field 20M**
CFSTI Prices HC$4.00 MF$1.00
Massachusetts Inst. Of Tech., Cambridge. Dept. Of Mechanical Engineering.
THERMAL CONTACT RESISTANCE.
by B. B. Mikic, and W. M. Rohsenow. Sep 66, 130p NASA-CR-78319
Contract NGR-22-009-065
Its Rept.-4542-41

Descriptors: Contact resistance, *Environment, *Metal surface, *Surface property, Analysis, Deformation, Flat, Fluid, Interface, Model, Prediction, Roughness, Smoothness, Surface, Thermal, Vacuum, Wave.

For abstract, see STAR 04 22.

N66-37526 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile And Space Div.
FREE MOLECULE HEAT TRANSFER IN THE IONOSPHERE.
by L. M. Gilbert, and S. M. Scala. Jan 65, 34p NASA-CR-78377, R65SD41
Contract NASR-32

Descriptors: *Flight vehicle, *Heat transfer, *Ionospheric heating, *Molecular flow, Entry, Flux, Free, High altitude, Kinetics, Mass, Particle, Supersonics, Surface.

For abstract, see STAR 04 22.

AD-640 858 **See Field 20K**

AD-641 103 **See Field 20L**

AD-641 105 **See Field 13A**

AD-641 124 **See Field 20D**

AD-641 145 **See Field 20I**

NBS-TN-246 **See Field 7D**

PB-173 243 **See Field 20D**

PB-173 244 **See Field 20D**

20N. WAVE PROPAGATION

AD-410 368 **Field 20N**
CFSTI Price: HC$3.60
Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
ELECTROMAGNETIC MEASUREMENTS ON CANADIAN 100 TON TNT EXPLOSION,
by Clyde B. Dobbie, and Stuart R. Hamilton. 15 Apr 63, 31p EGG-B-2572
Contract AF 30 (602)-2546, ARPA Order-180-60
RADC-TDR-63-193

Descriptors: (*Electromagnetic waves, Detection), (*Explosion effects, Electromagnetic waves), Photographic recording systems, Photographic analysis, Air burst, TNT.

The detonation of a 100-ton TNT charge took place on 3 August 1961 at the Suffield Experimental Station in Ralston, Alberta Province, Canada. The explosion was intended to (1) measure the electromagnetic (EM) signals, and (2) perform high speed photographic measurements to assist in the analysis of the EM data. This report contains a description of the EM detection phase of the effort. Detection and recording of the EM signal was attempted using loop antennas preamplifiers, and a tape recorder. Time correlation between film records and EM records was provided by Fiducial Marker Generators. No EM signal was detected. It is believed that this was due to the fact that the charge was hemispherical, and was on the surface of the earth. (Author)

AD-640 644 **Field 20N**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
ON THE IDENTIFICATION OF SYSTEMS AND THE UNSCRAMBLING OF DATA-III: ONE-DIMENSIONAL WAVE AND DIFFUSION PROCESSES,
by R. Bellman, D. Detchmendy, H. Kagiwada, and R. Kalaba. Oct 66, 27p RM-5173-PR
Contract AF 49 (638)-1700
See also AD-453 476.

Descriptors: (*Propagation, Numerical analysis), Diffusion, Numerical methods and procedures, Differential equations, Integral transforms.

Three effective numerical approaches to a novel inverse problem in wave propagation and diffusion are presented. Given partial information concerning the solution of the telegrapher's equation, various coefficient in the equation are determined using Laplace transforms, semidiscretization, and finite difference methods. Fields of application are radio-wave propagation, automatic control, and oceanography, where it is desired to determine the physical properties of an inhomogeneous medium based on observations of the response of the medium to an input signal. (Author)

AD-640 755 **Field 20N**
CFSTI Prices: HC$4.00 MF$0.75
Aero Geo Astro Corp., Corona, Calif.
VLF IONOSPHERIC SOUNDER PROGRAM.
Final rept.,
by David J. Shamp, Lawrence E. Christensen, and Andres Fark. 18 Mar 66, 106p
Contract Nonr-3163 (00)
Proj. NR-088-012

Descriptors: (*Ionospheric propagation, Very low frequency), (*Pulse systems, Ionospheric propagation), Experimental data, Measurement, Radio equipment, Phase shifters, Pulse generators, Test equipment.

The VLF pulse sounder is a new basic tool for studying the lower ionosphere. The system is a combination pulse sounder, phase sounder, and polarimeter. A concurrent program of system improvement and experimental study of the ionosphere has been conducted. The results of this program as presented here should be of use in planning various types of communication, navigation, and detection systems which make use of VLF propagation or distribution within the lower ionosphere. Since HF propagation is markedly affected by the lower ionosphere, the program should also ultimately contribute to systems in the HF band. This program was limited to experimental data collection. The gathered data is presented without an assessment of its theoretical value or of the experimental capability employed in its collection. (Author)

AD-640 819 **Field 20N**
CFSTI Prices: HC$4.00 MF$1.00
Antenna Lab., Calif. Inst. of Tech., Pasadena.
RADIATION OF A POINT CHARGE MOVING UNIFORMLY OVER AN INFINITE ARRAY OF CONDUCTING HALF-PLANES.
Tal rept.,
by John Lam. Aug 66, 129p TR-37
Contract AF 49 (638)-1266

Descriptors: (*Electromagnetic waves, Diffraction), Electromagnetic fields, Boundary value problems, Integral equations, Antenna arrays, Antenna radiation patterns, Metal plates, Propagation.

The problem of the excitation of an infinite array of parallel, semi-infinite metallic plates by a uniformly moving point charge is studied by the Wiener-Hopf method. It is treated as a boundary value problem for the potentials of the diffracted electromagnetic fields. The formulation of this problem makes use of the well-known conditions on the electromagnetic fields at a metallic boundary. A method is used to translate these boundary conditions on the fields into boundary conditions on the potentials. In this way the problem is formulated in terms of a set of dual integral equations for the current densities induced on the plates by the point charge. These integral equations are exactly soluble by the Wiener-Hopf technique. The solutions are found to satisfy the famous edge conditions for diffraction problems, and are therefore unique. From these solutions exact expressions for the diffracted fields are derived in the form of Fourier integrals. It is seen that these fields represent a radiation of electromagnetic energy. The method of steepest descent is then used to obtain expressions for the radiation fields, the Poynting vector, the frequency spectrum and the radiation pattern. The radiation shows that the array of plates behaves both like a diffraction grating and a series of parallel-plate waveguides. (Author)

AD-640 978 **Field 20N, 4A**
CFSTI Prices: HC$3.00 MF$0.75
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
THE EFFECT OF THE FINITE WANTED PULSE WIDTH ON THE RADIO WAVE INTERACTION EXPERIMENTS,
by Thomas D. Pinkerton. 15 Jun 66, 96p
Scientific-274
Contract Nonr-656 (35), Grant NSF-GP-846
Proj. NR-087-164

Descriptors: (*Ionospheric propagation, Pulse modulation), Radio transmission, Magnetohydrodynamics, Electron density.

In the report the wave interaction equations are extended to take into account the finite width of the wanted pulse. The effect of the wanted pulse width upon the wave interaction experiment is then demonstrated through the use of this new equation by showing the effect that it has on the interaction coefficient height profile and by showing its importance in electron density synthesis. The significance of the effect of underlying ionization is demonstrated by evaluating the error that occurs in the synthesized electron density profile when it is neglected. It is also shown that the region of dominant heating plays an important role in determining whether underlying ionization can be neglected in synthesizing the electron density. A technique of obtaining the whole interaction coefficient height profile by making a simultaneous measurement of the fundamental frequency component of the repetitive disturbing pulses and a number of its harmonics is presented and a feasibility study of this technique is made. It is found that this technique can eliminate the long sweep time

presently needed to make interaction measurements and could possibly allow data to be reasonably extrapolated to include below its present minimum height. (Author)

AD-640 991 **Field 20N, 4A**
CFSTI Prices: HC$3.00 MF$0.50
IIT Research Inst., Chicago, Ill.
ANALYSIS OF LOW LATITUDE D AND E REGION DATA.
Semi-annual technical rept., 15 Nov 65-15 May 66,
by Robert D. Sears. Sep 66, 56p T-6142
Contracts N00014-66-C0030, ARPA order-749
Proj. NR-088-029

Descriptors: (*Ionospheric propagation, *Electron density), Analysis, Absorption, Riometers, Magneto-optic effect.

Analyses of ionograms, high frequency phase and amplitude data and riometer measurements of absorption which will lead to a better determination of the D and E region electron density profile for low latitude regions are described. True height analyses of sample ionograms allows determination of the contribution of the F region to 30 MHz absorption as determined from the riometer data. The topside F region is fit by a Chapman layer and F region temperature effects are qualitatively considered to show that the computed absorption from the F region tends to be a maximum estimate for that region. The computation of diurnal absorption variation from the 30 MHz riometer data requires that the cosmic noise power which would be received in the absence of absorption be computed. A program which has been developed to predict the cosmic noise diurnal variation given a particular site and antenna pattern has been improved and the results to date are described. The separation of E and F region reflection modes by comparison of the phase data with ionogram virtual group paths for the same frequencies shows that the different modes can be separated in the data with little ambiguity. Theory which forms the basis of the analysis of phase, amplitude, group path, and absorption data is summarized and two sample analyses are performed to show the sensitivity of the Faraday fading data to small changes in electron content along the signal path. The group and phase data are compared with the amplitude results to show their relationship and the means of identifying the height of variation of electron content along a propagation path. (Author)

AD-641 014 **Field 20N**
CFSTI Prices: HC$1.00 MF$0.50
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
THE FREQUENCY-POWER RELATION IN A TRAVELING-WAVE MODULATED DIELECTRICS,
by S. T. Peng, and E. S. Cassedy. 18 May 66, 14p PIBMRI-1327-66
Contract AF 49 (638)-1402
Proj. AF-4751
AFOSR-66-2333

Descriptors: (*Electromagnetic waves, Propagation), (*Dielectrics, Wave transmission), Modulation, Acoustics, Transmission lines.

In a steady state analysis, the Manley-Rowe frequency-power relation is shown to valid for the propagation of electromagnetic waves through a dielectric medium which is modulated with a traveling acoustic wave. The Fourier amplitudes of the internal electromagnetic fields are exactly calculated and shown to satisfy this relation. In the pass band a net transfer of frequency-power is permitted. Frequency-power transfer vanishes in the stop band, but this does not imply zero transfer of real power. As an application, the frequency-power relation was used to find an invariant constraint on the scattering matrix of a two-part network formed by a traveling-wave-modulated transmission line section. It is shown that the scattering matrix is no longer unitary, that the modulated medium can give energy to or absorb energy from the signal waves, depending on the operation conditions. (Author)

AD-641 100 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.75
Lockheed Missiles and Space Co., Sunnyvale, Calif.
THE METHOD OF SPHERICAL REPRESENTATION FOR TREATING ELECTROMAGNETIC SCATTERING.
Final rept., 15 Apr 65-14 Apr 66,
by W. H. Watson. 14 Apr 66, 69p LMSC-M-97-66-1
Contract AF 19 (628)-5094
Proj. AF-4600
Task 460004
AFCRL-66-91

Descriptors: (*Electromagnetic waves, Scattering), (*Scattering, *Special functions (Mathematical)), Theory, Backscattering, Radar echo areas, Spheres.

Since the distant scattered radiation is best represented as spherical waves, and generalized spherical functions may be used to establish a system of components for field vectors, each of which transforms independently on rotation, a spherical representation can be achieved with a geometry in which the surface of the scatterer is transformed into a sphere. At large distances, this geometry is chosen congruent with that of ordinary space. The generalized spherical functions are then taken to be functions of the angles in the spherical polar coordinate system in the transformed space, whose metric is non-Euclidean. Relevant properties of generalized spherical functions and means for computing them are described, and also the recurrence relations, derived from group theory, used to compute coupling integrals. The representation of spherical waves by generalized spherical functions, the transformation of Maxwell's equations, and the representation of an arbitrarily polarized electromagnetic wave arbitrarily directed with respect to the polar axis of the spherical representation is developed. Geometrical and electromagnetic representation for an axially symmetric scatterer is treated in detail, and the derivation of coordinate systems from electrostatic field distributions is presented as a general method. The procedure for finding the scattered field, backscattering cross section, and radar scattering matrix for a perfectly conducting prolate spheroid is elaborated. Scattering by limiting prolate and oblate spheroids is discussed with advantage in terms of the spherical representation. (Author)

N66-30163 **Field 20N**
CFSTI Prices HC$5.00 MF$1.00
Raytheon Co., Sudbury, Mass. Space And Information Systems Div.
MILLIMETER COMMUNICATION PROPAGATION PROGRAM, VOLUME I FINAL REPORT, 1 NOV. 1964 - 1 NOV. 1965.
1965, 177p NASA-CR-76093, FR-65-334-1
Contract NAS5-9523

Descriptors: *Experiment design, *Millimeter wave, *Space communication, *Wave propagation, Absorption, Antenna, Application, Atmospheric, Communication, Equipment, Hardware, Instrumentation, Laboratory, Manned, Millimeter, Orbit, Propagation, Radar, Refraction, Satellite, Space, Technology, Wave, Weather.

For abstract, see STAR 04 17.

N66-30164 **Field 20N**
CFSTI Prices HC$6.00 MF$1.25
Raytheon Co., Sudbury, Mass. Space And Information Systems Div.
MILLIMETER COMMUNICATION PROPAGATION PROGRAM, VOLUME II FINAL REPORT, 1 NOV. 1964 - 1OV. 1965.
1965, 230p NASA-CR-76095, FR-65-334-2
Contract NAS5-9523

Descriptors: *Atmospheric refraction, *Data processing, *Millimeter wave, *Space communication, *Wave propagation, Absorption, Aircraft, Antenna, Atmospheric, Communication, Data, Low altitude, Manned, Millimeter, Orbit, Processing, Propagation, Radar, Receiver, Refraction, Satellite, Space, Spacecraft, Synchronous, Wave, Weather.

For abstract, see STAR 04 17.

N66-36860 **Field 20N**
CFSTI Prices HC$4.00 MF$0.75
Illinois Univ., Urbana. Antenna Lab.
A TECHNIQUE FOR SOLVING CERTAIN WIENER- HOPF TYPE BOUNDARY VALUE PROBLEMS TECHNICAL REPORT NO. 9.
by C. P. Bates, and R. Mittra. May 66, 113p NASA-CR-78116, AFCRL-66-352
Grant NSG-395, Contract AF 19/628/-3819
Its Antenna Lab. Rept.-66-4

Descriptors: *Boundary value problem, *Problem solving, *Wiener-hopf equation, Analysis, Boundary, Dielectric, Excitation, Harmonic, Parallel, Plasma, Plate, Problem, Slab, Solution, Time, Value, Waveguide.

For abstract, see STAR 04 22.

N66-37568 **Field 20N**
CFSTI Prices HC$2.00 MF$0.50
Illinois Univ., Urbana. Electrical Engineering Research Lab.
PROPAGATION OF SPHERICAL WAVES THROUGH AN INHOMOGENEOUS MEDIUM CONTAINING ANISOTROPIC IRREGULARITIES.
by C.-H. Liu. 15 Sep 66, 36p NASA-CR-78360
Grant NSG-24-59

Descriptors: *Anisotropy, *Ionospheric propagation, *Spherical wave, Amplitude, Equation, Fluctuation, Green function, Inhomogeneity, Irregularity, Medium, Phase, Random, Slab.

For abstract, see STAR 04 22.

AD-640 775 **See Field 20I**

AD-640 813 **See Field 17B**

AD-640 942 **See Field 17B**

AD-640 972 **See Field 9E**

21A. AIR-BREATHING ENGINES

N66-36857 **Field 21A**
CFSTI Prices HC$3.25 MF$1.00
General Electric Co., Cincinnati, Ohio. Flight Propulsion Div.
ANALYSIS OF OVERALL AND INTERNAL PERFORMANCE OF VARIABLE-GEOMETRY ONE-STAGE AND TWO-STAGE AXIAL-FLOW TURBINES.
by E. E. Flagg. 30 Apr 66, 153p NASA-CR-54449, GE-R66FPD259
Contract NAS3-7262

Descriptors: *Axial flow turbine, *Two-stage turbine, *Variable geometry structure, Axial, Efficiency, Flow, Geometry, Hub, Internal, Mach number, Map, Performance, Rotor, Single, Speed, Stage, Stator, Structure, Turbine, Two, Variable, Variation, Work.

For abstract, see STAR 04 22.

AD-640 616 **See Field 21E**

21B. COMBUSTION AND IGNITION

AD-482 941 **Field 21B, 21H**
CFSTI Prices: HC$5.00 MF$1.00
Jet Propulsion Center, Purdue Univ., Lafayette, Ind.
THE INTERACTION OF A FINITE AMPLITUDE PRESSURE DISTURBANCE WITH A COMBUSTION REGION,
by G. M. Lehmann. Feb 66, 190p Technical memo. TM-66-1, JPC-418
Contract Nonr-1100 (21), Grant AF-AFOSR-753-65

Descriptors: (*Rocket motors, Combustion), (*Combustion, Stability), Screaming combustion, Pressure, Oscillation, Ramjet engines, Gas turbines, Liquid rocket propellants, Solid rocket propellants, Shock waves, Heat transfer, Gaseous rocket propellants, Data, Propagation, Molecular weight, Diffusion, Viscosity, Errors, Thermal conductivity, Decomposition, Ammonium compounds, Perchlorates, Butadienes, Polymers, Acids, Digital computers.

The method for calculating the interaction of a nonuniform shock with the combustion region at the surface of a burning solid propellant is presented. Interactions were calculated for initial nonuniform shock amplitudes ranging from 2.5 to 150 psi at combustion pressures of 250, 500, and 1000 psia. Results indicated that the amplification of the nonuniform shock by the combustion region decreases with increasing combustion pressure and increasing initial shock amplitude. It was found that the major factor that lead to the amplification of the nonuniform shock was the heat addition in the combustion region. The major attenuating effects were the heat transfer into the propellant, the energy absorbed by the propellant as the shock reflected from its surface, and the steady state velocity gradient in the combustion region. (Author)

AD-640 696 **Field 21B, 7D**
Not available from CFSTI.
Texas Univ., Austin. Dept. of Chemistry.
SHOCK-TUBE STUDY OF THE HYDROGEN-OXYGEN REACTION. II. ROLE OF EXCHANGE INITIATION,
by Dennis L. Ripley, and W. C. Gardiner Jr. 19 Aug 65, 12p
AROD-3390:6
See also AD-621 199.
Availability: Published in The Journal of Chemical Physics v44 n6 p2285-96 Mar 15 1966.

Descriptors: (*Hydrogen, Reaction kinetics), (*Oxygen, Reaction kinetics), (*Shock tubes, Chemical reactions), Ignition, Exchange reactions, Line spectrum, Ignition lag, Equations.

Identifiers: Chain reactions (Chemical).

An extended analytical solution to the rate equations for the branching-chain reactions of the H2-O2 reaction under shock-tube conditions is presented. Together with an experimental determination of the detection threshold for OH of the Bi (3067) line-absorption method used in earlier experiments, this solution allows quantitative comparison of calculated and experimental ignition delays. It is shown that calculation and experiment can be brought into agreement with slight modification of chain-reaction rate coefficients deduced from the results of other studies of the H2-O2 reaction. The essential role of the rate of chain initiation by a path other than diatom dissociation in determining the ignition delays is brought to light. Rate-coefficient expressions for the chain reactions are suggested and supported. (Author)

AD-640 830 **Field 21B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., Santa Barbara.
COMBUSTION KINETICS OF TETRAFLUORETHYLENE.
Final technical rept.,
by Richard A. Matula. Sep 66, 19p
Grant AF-AFOSR-981-65
Proj. AF-9750
Task 975002
AFOSR-66-2336

Descriptors: (*Halogenated hydrocarbons *Combustion), (*Fluorine compounds, Combustion), Ethylenes, Oxidation, Organic oxygen compounds, Pyrolysis, Reaction kinetics, Gas analysis, Gas chromatography, Combustion products, Instrumentation, Programming (Computers).

Identifiers: Carbonyl fluoride, Tetrafluoroethylenes.

An experimental facility for the study of high temperature-kinetics in the C/F/O reaction system was designed and constructed. Apparatus for the production of high purity tetrafluoroethylene and carbonyl fluoride is described. The reaction vessel design, gas analysis system, furnace, and temperature measurement and control systems are also described. A discussion of the various solid support-stationary phase combinations tested for the gas chromatographic separation of the compounds: N2, O2, F2, CO, CO2, COF2, CF4, C2F4, C2F6, C3F6 and C3F8 is included. It is concluded that Fluorolue and Silicone Oil DC-FS-1265 are the most promising stationary phases for the required analysis. It is also noted that activated silica gel is useful for the analysis. Finally the capabilities of a Fortran IV thermochemical program which is presently being adapted for the necessary equilibrium computations are described. (Author)

N66-30606 **Field 21B**
CFSTI Prices HC$2.00 MF$0.50
Martin Co., Denver, Colo.
SOLID- PROPELLANT ROCKET EXHAUST EFFECTS (SPREE) AND METHODS OF ATTENUATION, VOLUME I - PROJECT SUMMARY.
by E. A. Darrow, and E. Lays. Jan 66, 40p
NASA-CR-76236, CR-65-93, VOL. I
Contract NAS10-2300

Descriptors: *Attenuator, *Rocket exhaust, *Solid propellant rocket engine, Acceleration, Aluminum, Attenuation, Damage, Effect, Equipment, Exhaust, Ground, Lift, Material, Method, Model, Motor, Plume, Prediction, Propellant, Protection, Rocket, Rocket engine, Scale, Solid, Support, Tower, Umbilical.

For abstract, see STAR 04 17.

N66-31361 **Field 21B**
CFSTI Prices HC$3.00 MF$0.75
Princeton Univ., N. J. Guggenheim Labs. For The Aerospace Propulsion
A STUDY OF INJECTOR SPRAY CHARACTERISTICS IN A SIMULATED ROCKET COMBUSTION CHAMBER INCLUDING LONGITUDINAL MODE PRESSURE OSCILLATIONS TECHNICAL REPORT NO. 730.
by D. A. Gary. Jun 66, 74p NASA-CR-76372
Contract NASR-217

Descriptors: *Combustion chamber, *Injector, *Pressure oscillation, *Spray characteristics, Chamber, Characteristics, Combustion, Data, Diameter, Distribution, Drop, Longitudinal, Oscillation, Pressure, Processing, Reduction, Rocket, Simulation, Spray.

For abstract, see STAR 04 17.

N66-32316 **Field 21B**
CFSTI Prices HC$2.50 MF$0.75
Bell Aerosystems Co., Buffalo, N. Y.
PHOTOGRAPHIC INVESTIGATION OF PROPELLANT STREAM BEHAVIOR IN A FIRING ROCKET ENGINE, VOLUME II TECHNICAL SUMMARY REPORT, 1 AUG. 1964 - 28 FEB. 1966.
by R. N. Eulner, T. G. Rossman, and L. M. Wood. 24 Jun 66, 69p NASA-CR-76722
Contract NAS8-11364
Its Rept.-9136-950001

Descriptors: *Liquid propellant rocket engine, *Propellant spray, *Shadow photography, Chamber, Diagram, Distribution, Equipment, Firing, Injector, Liquid, Optical, Photography, Propellant, Rocket engine, Shadow, Spray, Stream, System.

For abstract, see STAR 04 17.

N66-32547 **Field 21B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A METHOD FOR COMPUTING CHEMICAL-EQUILIBRIUM COMPOSITIONS OF REACTING-GAS MIXTURES BY REDUCTION TO A SINGLE ITERATION EQUATION.
by D. O. Allison, W. D. Erickson, and J. T. Kemper. Aug 66, 30p NASA-TN-D-3488

Descriptors: *Chemical composition, *Gas mixture, *Iterative solution, *Thermodynamic property, Air, Chemical, Composition, Computation, Computer, Energy, Equation, Equilibrium, Fortran, Free, Gas, Hydrogen, Iteration, Mixture, Model, Property, Reaction, Reduction, Single, Solution, Speed, Thermodynamic.

For abstract, see STAR 04 17.

N66-37281 **Field 21B**
CFSTI Prices HC$2.50 MF$0.75
Army Missile Command, Huntsville, Ala. Research Branch.
PREVENTION, DETECTION, AND SUPPRESSION OF HYDROGEN EXPLOSIONS IN AEROSPACE VEHICLES.
by G. J. Caras. 31 Mar 66, 59p NASA-CR-78268, RSIC-486
Sponsored In Part By Nasa

Descriptors: *Aerospace vehicle, *Explosion, *Hydrogen, *Safety hazard, Aerospace, Air, Detection, Fire, Hazard, Mixture, Prevention, Safety, Suppression, Vehicle.

For abstract, see STAR 04 22.

AD-640 705 **See Field 7D**

21C. ELECTRIC PROPULSION

N66-31942 **Field 21C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL INVESTIGATION OF A HIGH-VOLTAGE ISOLATION DEVICE FOR ION-THRUSTOR PROPELLANT FEED.
by S. Nakanishi. Aug 66, 32p NASA-TN-D-3535

Descriptors: *Feed system, *Ion source, *Isolation, *Thrustor, Apparatus, Bombardment, Characteristics, Current, Density, Design, Electrode, Electron, Feed, Flow, High voltage, Ion, Leakage, Mercury, Operation, Source, System, Tube, Vapor.

For abstract, see STAR 04 17.

N66-36786 **Field 21C**
CFSTI Prices HC$4.00 MF$1.00
Colorado State Univ., Fort Collins. Coll. Of Engineering.
TRANSIENT AND STEADY PERFORMANCE OF AN ION ROCKET THRUST AUGMENTOR FINAL REPORT.
Jan 66, 130p NASA-CR-77855, CER66-67VAS3
Grant NSG-570

Descriptors: *Electron emission, *Heat transfer, *Ionic propulsion, *Langmuir probe, *Pirani gauge, Accelerator, Augmentation, Beam, Cylinder, Electron, Emission, Ion, Ionic, Measurement, Performance, Porosity, Pressure, Propulsion, Rocket, Secondary, Thrust, Tungsten.

For abstract, see STAR 04 22.

N66-36794 Field 21C
CFSTI Prices HC$6.00 MF$1.25
Colorado State Univ., Fort Collins. Coll. Of Engineering.
ADVANCED ELECTRIC PROPULSION RESEARCH FIRST SEMIANNUAL REPORT.
by W. K. Mickelsen. 30 Jun 66, 221p NASA-CR-77939, MER66-67WRM-1
Cotract NGR-06-002-032

Descriptors: *Colloidal propellant, *Electric discharge, *Electric propulsion, *Lunar flight, *Radioactive isotope, *Specific impulse, Colloid, Discharge, Electric, Flight, Fuel, Heating, Impulse, Ion, Ionizer, Isotope, Lunar, Mission, Propellant, Propulsion, Radioactivity, Specific, Supply, Tank, Thrustor, Trend.

For abstract, see ST 04 22.

21D. FUELS

AD-640 937 Field 21D
CFSTI Prices: HC$4.00 MF$0.75
Dayton Univ., Ohio. Research Inst.
PHYSICAL AND CHEMICAL PROPERTIES OF JP-4 JET FUEL FOR 1965.
Annual rept., 1 May 65-1 Jun 66,
by William E. Brockman, and Donovan S. Duvall. Sep 66, 114p
Contract AF 33 (615)-2692
Proj. AF-3048
Task 304801
AFAPL-TR-66-83

Descriptors: (*Jet engine fuels, *Physical properties), (*Chemical properties, Jet engine fuels), Statistical analysis, Thermal stability.

Identifiers: JP-4 fuels.

The report is a compilation of suppliers' inspection data on 246 million barrels of JP-4 jet fuel purchased by the Air Force during 1965. These inspection data were reported to the Air Force Aero Propulsion Laboratory, Wright-Patterson Air Force Base, Ohio. A statistical study was made of twenty standard specification tests. All tests showed a skew distribution. No particular problems were noted in meeting any of the specification limits. The total volume of fuel included in this report was about 83% greater than in 1964. (Author)

AD-641 107 Field 21D, 11H
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
INVESTIGATION OF THE ANTIWEAR PROPERTIES OF REACTIVE FUELS,
by A. P. Gryaznov, and I. V. Rozhkov. 12 Apr 66, 11p FTD-TT-65-1730
TT-66-62518
Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v9 n4 p57-60 1964.

Descriptors: (*Jet engine fuels, Wear resistance), (*Fuel additives, Wear resistance), Test methods, Lubrication, Effectiveness, Surface-active substances, Phenols, Organic sulfur compounds, USSR.

Identifiers: Antiwear agents.

A procedure was developed which permits the evaluation of the properties of reactive fuels on a setup with fuel equipment used on a full-sized turbojet engine. In agreement with results obtained earlier, it was shown that of the standard reactive fuels, the highest antiwear qualities are had by the fuels T-5 and T-1, the lowest by the fuel T-2, the fuel TS-1 occupying a middle position. With the raising of the temperature of the fuel within the limits of from 60 to 150C, the wear of the frictional surfaces considerably increases. The addition to the fuel TS-1 of 0.01 - 0.02% of additives ionol (2,6-di-t-butyl-4-methylphenol) and V-15/2A (an organosulfur compound), which possess surface-active properties, makes it possible to improve the antiwear properties of the fuels. With the test of the fuel TS-1 with the additive ionol at temperatures higher than 100C there was noted the formation of deposits on the fuel equipment. (Author)

AD-641 109 Field 21D, 21E, 11F
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF SULFUROUS COMPOUNDS ON THERMAL STABILITY AND CORROSIVE PROPERTIES OF FUELS FOR TURBOCOMPRESSOR AIR-REACTIVE ENGINES,
by P. I. Davydov, and G. F. Bolshakov. 25 Apr 66, 15p FTD-TT-65-1276
TT-66-62520
Unedited rough draft trans. of mono. Borba s Korroziyey Dvigatelei Vnutrennego Sgoraniya i Gazoturbinnykh Ustanovok, n.p. 1962 p272-80.

Descriptors: (*Jet engine fuels, Sulfur compounds), (*Corrosion, Jet engine fuels), Thermal stability, USSR, Aliphatic compounds, Sulfides, Aromatic compounds, Organic sulfur compounds, Degradation.

Conclusions: (1) Aliphatic cercaptanes, contained in fuel as a result of long heating at 150 degrees, cause sharp corrosion of bronze and formation of tars and insoluble residue. It is necessary to reduce the mercaptan content in fuel. (2) The investigated sulfurous compounds, by their corrosive effect on metals and the effect of tar and residue formation processes in fuels during their heating to 150 degrees, are divided into the following descending series: mercaptanes, disulfides, aliphatic sulfides, aromatic sulfides, thiophanes. (Author)

AD-641 270 Field 21D
CFSTI Prices: HC$2.00 MF$0.50
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
INVESTIGATION OF THE AUTOXIDATION OF PETROLEUM FUELS.
Interim rept.,
by Maurice E. Le Pera. Jun 66, 26p CCL-204
Proj. DA-1C024401A106

Descriptors: (*Fuels, Oxidation), (*Petroleum, Fuels), (*Gasoline, Degradation), Aging (Materials), Peroxides, Storage, Antioxidants.

The deterioration of petroleum fuels was studied by investigation of their autoxidation susceptibilities. Federal and Military Specification fuels and commercial gasolines were subjected to a six-week accelerated aging test with analyses for generated hydroperoxides determined at weekly intervals. The resulting peroxide-time curves revealed autoxidation tendencies to vary considerably. Under the conditions of this aging technique, there is evidence that the bulk storage supply of combat gasoline (MIL-G-3056B) at Aberdeen Proving Ground is experiencing a gradual depletion of antioxidant quality. (Author)

AD-641 273 Field 21D
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
THE CONTENT OF EXISTENT GUMS IN DIESEL FUELS,
by N. S. Churilin, and V. V. Stepanova. Oct 66, 6p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-1M643324D-591
TT-66-62538, ERDL-T-1872-66
Soderjanie Facticheskikh Smol v Diselnykh Toplivach, trans. of Vsesoyznyi Nauchno-Issledovatelskii Institut Zheleznodorozhnogo Transporta. Vestnik (USSR), v24 n8 p23-4 1965.

Descriptors: (*Fuel oil, Fuel contamination), (*Fuel contamination, Colorimetric analysis), USSR, Determination, Impurities.

The article gives a description of a method for the rapid determination of the content of existent resins in diesel fuels by means of colorimetry. (Author)

N66-30257 Field 21D
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
POTENTIAL OF LIQUID-METHANE FUEL FOR MACH-3 COMMERCIAL SUPERSONIC TRANSPORTS.
by J. D. Eisenberg, M. D. Shovlin, and J. B. Whitlow Jr. Jul 66, 43p NASA-TN-D-3471

Descriptors: *Arrow wing, *Commercial aircraft, *Jet fuel, *Methane, *Supersonic transport, Aircraft, Arrow, Commercial, Fuel, Heat, Jet, Propulsion, Sink, Supersonic, Sweep, Transport, Turbojet, Wing.

For abstract, see STAR 04 17.

AD-641 271 See Field 7E

21E. JET AND GAS TURBINE ENGINES

AD-481 393 Field 21E
CFSTI Prices: HC$2.00 MF$0.50
Curtiss-Wright Corp., Quehanna, Pa.
DESIGN PROCEDURE FOR TRANSPIRATION AIR COOLED TURBINE BLADES.
Final rept. (Sppl.),
by R. Lang, and Wallis Lloyd. 15 Oct 58, 33p CWR-300-37
Contract NOas-56-495-c

Descriptors: (*Gas turbine blades, Air cooled), Rotor blades (Turbomachinery), Configuration, Heat transfer, Thermal conductivity, Thermal radiation, Design, Gas flow, Velocity, Feasibility studies, Programming (Computers), Laminar flow, Turbulence, Aerodynamic characteristics, Sweat cooling, Evapotranspiration.

The calculation procedure for determining the coolant flow required to maintain a given wall temperature in transpiration-cooled turbine blades is presented. The basic method has evoled from numerous modifications based upon the experience acquired during testing and evaluation of transpiration cooled configurations. The theory supporting the equations is included. The calculation procedure presented has been tried and proved to be a useful tool. It is believed that continued testing will further the understanding of the influence of turbulent flow on the aerodynamic and heat transfer characteristics of this type of cooling. With refinement of the theoretical approach improvement in the design procedure can be realized. In order that potentially feasible configurations can be evaluated quickly and economically, the calculation method has been programmed for the IBM 704 digital computer. A brief description of the methods of preparing input data for the machine and of the operation sequence employed by the machine is also included.

AD-640 616 Field 21E, 21H, 21A
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.

THRUST DEFLECTION FOR CRUISE,
by W. H. Krase. Sep 66, 12p P-3450

Descriptors: (*Thrust, Deflection), (*Engines +motors, Thrust), Ramjet engines, Rocket motors, Lift, Air-breathing engines (Unconventional), Drag.

The effects of lift/drag ratio and gross-thrust/ram-drag ratio on the benefits to be obtained from thrust deflection are analyzed, and it is shown that combinations of low values of these parameters can result in a substantial advantage. For instance, at a lift/drag ratio of 4 and a gross-thrust/ram-drag ratio of 1.1, the range may be increased about 34 percent. The required increases in altitude and in engine capture area are also shown. (Author)

AD-640 623 **Field 21E**
CFSTI Prices: HC$2.00 MF$0.50
Army Engineer Research and Development Labs., Fort Belvoir, Va.
LARC 5-7X GAS-TURBINE APPLICATION.
Final rept.,
by Samuel M. Hickson. Aug 66, 39p Rept. no. 1866
Proj. DA-1M443012D25605

Descriptors: (*Gas turbines, Amphibious vehicles), Cockpits, Tests, Performance (Engineering).

The report covers studies and tests of an experimental gas-turbine installation in a prototype LARC 5. A principal feature of the experiment was determination of a satisfactory method of handling large quantities of engine aspiration air and exhaust gases without taking in excessive amounts of sea water. LARC prototype was used as typical vehicle because of its immediate availability and store of test information compiled during its recent development. Pratt and Whitney ST6B turbine, secured on loan from manufacturer, was installed as typical turbine which had good record of reliability in power range desired. Investigation consisted primarily of accumulation of 400 operating hours in environment of amphibious operation. (Author)

AD-640 736 **Field 21E, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
HOT CORROSION IN MARINE GAS TURBINE,
by G. J. Danek Jr. Oct 66, 23p MEL-392/66
Proj. S-F013-06-14
Task 3888

Descriptors: (*Gas turbines, *Corrosion), Marine engines, Sodium compounds, Sulfates, Fuel additives, Corrosion inhibition, Coatings, Corrosion-resistant alloys, High-temperature research.

The phenomenon of hot corrosion in marine gas turbines is stimulated by the presence of sodium sulfate. Two avenues can be followed to minimize deterioration by hot corrosion: (1) control of environmental conditions to prevent the formation of a molten slag and (2) development of materials to resist corrosive attack. Several techniques have been proposed to curtail the formation of a fused slag: limiting the gas turbine operating temperature which, though effective, seriously limits efficiency and fuel economy (present method); eliminating sea salt from the combustion zone by filtering to avoid formation of the aggressive environment; and other promising techniques for controlling environmental conditions such as blade cooling and fuel additives. The development of materials with built-in hot corrosion resistance would provide the most desirable solution to the problem. Therefore, considerable effort is being expended to devise taior-made coatings and alloys. Supporting the development efforts are mechanism studies which are aimed at understanding of the interactions between the marine gas turbine environment and hot section materials, and identifying beneficial alloying constituents. Experience so far indicates that none of the specific approaches alone will provide a complete solution to the problem. (Author)

AD-641 015 **Field 21E, 13J**
CFSTI Prices: HC$3.00 MF$0.75
Navy Marine Engineering Lab., Annapolis, Md.
AN INDIRECTLY HEATED GAS-TURBINE CYCLE FOR MINIMIZING SULFIDATION CORROSION.
Technical memo.,
by John H. Garrett. Oct 66, 60p MEL-TM-311/66

Descriptors: (*Gas turbines, *Corrosion inhibition), (*Marine propulsion, Gas turbines), Sulfides, Chemical reactions, Heating, Air, Combustion chambers, Gaow.

Identifiers: Sulfidation.

A method for minimizing sulfidation corrosion by indirectly heating the air for the high-temperature portion of a gas-turbine cycle is proposed and discussed. The exhaust air from the high pressure turbine passes through the combustion chamber and air heater and then through the low-pressure turbine. Calculations of thermal efficiency and weight are made for both simple and regenerated versions of this cycle. For comparison, similar weight and efficiency calculations are made for conventional simple and regenerated cycles. These calculations show that, in comparison with the conventional simple cycle marinized aircraft engine, weight of the proposed engine is about 100 percent greater thermal efficiency is about the same; but on the favorable side, air flow per horsepower is less by about 40 percent. In comparison with a conventional regenerated engine, the thermal efficiency of a regenerated indirect air cycle engine is about the same, but the weight is about 50 percent less and the air flow is reduced by about 40 percent. With the proposed cycle, hi h compression-ratio engines are shown to provide high efficiency in the regenerated version, in contrast to conventional regenerated engines where low compression ratios must be used. (Author)

AD-641 111 **Field 21E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SELECTION OF THE OPTIMUM PARAMETERS OF A SUPERSONIC RAMJET ENGINE WITH A HEAT EXCHANGER,
by V. T. Vorogushin. 18 Apr 66, 13p FTD-TT-65-581
TT-66-62522
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) n4 p75-81 1961.

Descriptors: (*Ramjet engines, Supersonic flight), Heat exchangers, Performance (Engineering), Temperature, Thrust, Velocity, USSR.

The work contains the procedure for computing the supersonic ramjet engine with a heat exchanger. In it there is analysed the influence of the temperature of heat, the flow T*, and the speed of flight on the value and the coefficient of thrust, and the influence of a series of parameters on the required heat emitting surface. The results of the work enable one to proceed with the choice of the original optimum parameters in the computation of the supersonic ramjet engine with a heat exchanging apparatus. (Author)

N66-31625 **Field 21E**
CFSTI Prices HC$5.00 MF$1.00
Aerojet-general Corp., Sacramento, Calif.
MECHANICAL DESIGN OF A CURTIS TURBINE FOR THE OXIDIZER TURBOPUMP OF THE M-1 ENGINE.
by E. Roesch. 15 Jun 66, 169p NASA-CR-54815, AGC-8800-72
Contract NAS3-2555

Descriptors: *M- 1 rocket engine, *Turbine, *Turbopump, Aerodynamic, Assembly, Design, Exhaust, Function, Inlet, Interface, Manifold, Material, Mechanical, Nozzle, Oxidizer, Property, Reverse, Rotor, Row, Structural, System, Weight.

For abstract, see STAR 04 17.

N66-37046 **Field 21E**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
PROGRESS IN AIRCRAFT GAS TURBINE ENGINE DEVELOPMENT.
by A. Silverstein. 1966, 30p NASA-TM-X-52240
Presented At Intern. Council Of The Aeron. Sci. 5th Congr., London, 12-16 Sep. 1966

Descriptors: *Engine design, *Gas turbine, Aircraft, Attenuation, Cooling, Design, Engine, Fuel, Gas, Inlet, Jet, Liquid, Matching, Material, Methane, Noise, Temperature, Turbine, Turbofan.

For abstract, see STAR 04 22.

AD-641 109 See Field 21D

21F. NUCLEAR PROPULSION

AD-640 622 See Field 18G

21G. RECIPROCATING ENGINES

AD-456 740 See Field 10A

21H. ROCKET MOTORS AND ENGINES

N66-30181 **Field 21H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ATOMIZATION OF ETHANOL JETS IN A COMBUSTOR WITH OSCILLATORY COMBUSTION-GAS FLOW.
by R. D. Ingebo. Jul 66, 22p NASA-TN-D-3513

Descriptors: *Atomization, *Drop size, *Ethyl alcohol, *Rocket combustor, Alcohol, Combustor, Distribution, Downstream, Drop, Ethyl, Exhaust, Flow, Gas, Injection, Jet, Oscillation, Photomicrograph, Rocket, Siren, Size, Stream.

For abstract, see STAR 04 17.

N66-30300 **Field 21H**
CFSTI Prices HC$4.00 MF$0.75
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
A FORTRAN PROGRAM FOR HEAT TRANSFER ANALYSIS OF THE J-2 ENGINE.
by J. G. Floyd, H. H. Seidel, and B. G. Smith. Mar 65, 107p NASA-CR-67353, R-127
Contract NAS8-5289

Descriptors: *Engine coolant, *Fortran, *Pressure drop, Computer, Coolant, Drop, Engine, Equilibrium, Expansion, Heat, Heat transfer, Jacket, Mole, Pressure, Programming, Rocket, Specific, Temperature, Thermochemistry, Thermodynamics.

For abstract, see STAR 04 17.

N66-30339 Field 21H
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOCALIZED OVERHEATING IN AEROBEE REGENERATIVELY COOLED THRUST CHAMBERS.
by P. S. Bushnell Jr, and J. R. Busse. Mar 66, 31p NASA-TM-X-55516, X-721-66-146

Descriptors: *Aerobee rocket, *Combustion chamber, *Convergent nozzle, *Nozzle, *Regenerative cooling, *Rocket engine, Burnthrough, Combustion, Convergence, Cooling, Design, Regeneration, Thrust.

For abstract, see STAR 04 17.

N66-30398 Field 21H
CFSTI Prices HC$7.29 MF$2.00
Bell Aerosystems Co., Buffalo, N. Y.
EXPERIMENTAL AUXILIARY ROCKET ENGINE, PART I FINAL REPORT.
1 May 66, 429p NASA-CR-76150
Contract NAS7-305
Its Rept.-8374-933004

Descriptors: *Reaction control, *Rocket engine design, *Spacecraft control, Auxiliary, Chamber, Control, Design, Maneuver, Metal, Reaction, Refractory, Rocket engine, Spacecraft, Thrust, Wall.

For abstract, see STAR 04 17.

N66-30399 Field 21H
CFSTI Prices HC$5.00 MF$1.25
Bell Aerosystems Co., Buffalo, N. Y.
EXPERIMENTAL AUXILIARY ROCKET ENGINE, PART II FINAL REPORT.
5 Jan 66, 195p NASA-CR-76155
Contract NAS7-305
Its Rept.-8374-933004

Descriptors: *Engine testing, *Reaction control, *Rocket engine design, *Spacecraft control, Chamber, Characteristics, Control, Design, Engine, Maneuver, Performance, Reaction, Rocket engine, Spacecraft, System, Testing, Thrust.

For abstract, see STAR 04 17.

N66-30758 Field 21H
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
OPTIMIZATION OF SYSTEM OPERATING PARAMETERS FOR HEAT STERILIZABLE LIQUID PROPULSION SYSTEMS.
by H. D. Curtis, and A. D. Harper. 1 Jun 65, 35p NASA-CR-76318, JPL-TM-33-211
Contract NAS7-100

Descriptors: *Heat treatment, *Liquid propellant, *Propulsion system, *Spacecraft sterilization, External, Heat, Internal, Liquid, Load, Mass, Operation, Parameter, Pressurization, Propellant, Propulsion, Spacecraft, Sterilization, System, Tank, Treatment, Vent.

For abstract, see STAR 04 17.

N66-32114 Field 21H
CFSTI Prices HC$3.75 MF$1.50
Martin Co., Denver, Colo.
PRESSURIZATION SYSTEM FOR USE IN THE APOLLO SERVICE PROPULSION SYSTEM INTERIM REPORT.
by D. N. Gorman, and G. R. Page. Jul 65, 252p NASA-CR-65314, CR-65-50
Contract NAS9-3521

Descriptors: *Apollo project, *Fuel tank pressurization system, *Propulsion system, Cascade, Fuel, Gas, Helium, Hydrazine, Hydrogen, Mass, Molecular, Pressurization, Propulsion, Reduction, Residual, Storage, System, Tank, Temperature, Weight.

For abstract, see STAR 04 17.

N66-32188 Field 21H
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN AND COOLING PERFORMANCE OF A DUMP- COOLED ROCKET ENGINE.
by J. K. Curley, P. A. Masters, A. J. Pavli, and R. M. Schwartz. Aug 66, 47p NASA-TN-D-3532
Contract 730-100-31-06-22

Descriptors: *Engine coolant, *Liquid hydrogen, *Rocket engine design, Aluminum, Coating, Combustion, Coolant, Design, Dump, Engine, Evaluation, Exit, Firing, Flow, Flux, Heat, Hydrogen, Impulse, Liquid, Oxide, Oxygen, Pressure, Propellant, Rocket, Temperature, Thrust.

For abstract, see STAR 04 17.

N66-32189 Field 21H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPRESSED-AIR MODEL INVESTIGATION OF SOLID ROCKET OVERPRESSURES DUE TO INTERFERENCE FROM AFT-END IGNITION ROCKET.
by R. J. Salmi. Aug 66, 23p NASA-TN-D-3537

Descriptors: *Chamber pressure, Combustion chamber, *Rocket booster, *Solid propellant ignition, Aft, Booster, Chamber, Combustion, End, Exhaust, Grain, Ignition, Interference, Jet, Nozzle, Overpressure, Port, Position, Pressure, Propellant, Ratio, Rocket, Solid.

For abstract, see STAR 04 17.

N66-32330 Field 21H
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
DISTRIBUTED PARAMETER ANALYSIS OF PRESSURE AND FLOW DISTURBANCES IN ROCKET PROPELLANT FEED SYSTEMS.
by R. G. Dorsch, C. Lightner, and D. J. Wood. Aug 66, 55p NASA-TN-D-3529

Descriptors: *Dynamic response, *Feed system, *Mathematical model, *Unsteady flow, Computer, Digital, Distribution, Disturbance, Dynamic, Feed, Flow, Mathematics, Model, Parameter, Pressure, Program, Propellant, Response, Rocket, System, Unsteady.

For abstract, see STAR 04 17.

N66-32334 Field 21H
CFSTI Prices HC$3.00 MF$0.75
Aerojet-general Corp., Sacramento, Calif.
HYDRAULIC DESIGN OF THE M-1 LIQUID HYDRGEN TURBOPUMP.
by J. Farquahr, and B. K. Lindley. 15 Jul 66, 106p NASA-CR-54822, AGC-8800-68
Contract NAS3-2555

Descriptors: *Axial pump, *Hydraulic pump, *M- 1 rocket engine, *Turbopump, Axial, Cryogenic, Design, Engine, Flow, Hydraulic, Hydrogen, Liquid, Propellant, Pump, Rocket.

For abstract, see STAR 04 17.

N66-32645 Field 21H
CFSTI Prices HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex. Engineering Analysis Section.
FUEL SLOSHING STUDIES QUARTERLY PROGRESS REPORT NO. 3.
by H. N. Abramson, L. R. Garza, and D. D. Kana. 1 Jan 62, 42p NASA-CR-76977
Contract NAS8-1555

Descriptors: *Cylindrical tank, *Sloshing, *Spherical tank, Baffle, Bare Cylinder, Damping, Excitation, Force, Free, Pitch, Ring, Spherical, Tank, Translation, Vibration, Wall.

For abstract, see STAR 04 17.

N66-37126 Field 21H
CFSTI Prices HC$3.75 MF$1.25
Israel Program For Scientific Translations, Ltd., Jerusalem.
SOVIET ROCKETRY - SOME CONTRIBUTIONS TO ITS HISTORY.
by A. A. Blagonravov. 1966, 224p NASA-TT-F-343, TT-66-51023
Transl. Into English Of The Book "iz Istorii Raketnoi Tekhniki" Moscow, Izd. Nauka, 1964 Published For Nasa And Nsf

Descriptors: *Rocketry, *Scientist, *Space flight, *U.s.s.r., Aircraft, Bibliography, Biography, Data, Development, Engineering, Flight, History, Interplanetary, Jet, Multistage, Review, Rocket.

For abstract, see STAR 04 22.

AD-482 941 See Field 21B

AD-640 616 See Field 21E

21I. ROCKET PROPELLANTS

AD-640 809 Field 21I
CFSTI Prices: HC$1.00 MF$0.50
Rocket Propulsion Establishment, Westcott (England).
COMPOSITE SOLID PROPELLENT IGNITION: IGNITION OF AMMONIA AND OTHER FUELS BY PERCHLORIC ACID VAPOUR.
Technical rept.,
by G. S. Pearson, and D. Sutton. Jun 66, 22p RPE-TR-66/8

Descriptors: (*Solid rocket propellants, *Ignition), (*Composite rocket propellants, Ignition), (*Ammonia, Ignition), (*Perchloric acid, Ignition), Solid rocket fuels, Solid rocket oxidizers, Ammonium compounds, Perchlorates, Vapors, Ignition lag, Polyethylene plastics, Isocyanate plastics, Styrene plastics, Acrylic resins, Gaseous rocket propellants, Methane, Ethylenes, Alkenes, Great Britain.

Identifiers: Ammonium perchlorate, Butenes.

The ignition of polyisobutene, polyurethane, polystyrene and polymethyl-methacrylate has been studied with oxygen gas and with perchloric acid vapour under the same experimental conditions. All these fuels ignited with perchloric acid vapour at 200-250C whereas ignitions with oxygen were only achieved at temperatures above 350C. Less volatile fuels such as carbon black, nylon and terylene also ignited with perchloric acid vapour at 200-250C. Ignition of ammonia, methane, ethylene and isobutene was not achieved by perchloric acid vapour in the absence of a surface at 200-250C. In the presence of a surface the order of decreasing ignitability was ammonia, isobutene, ethylene, methane. Cupric chromate and ferric oxide were effective catalysts in the ignition of gaseous fuels with perchloric acid vapour. Titanium dioxide, silica and alumina had no detectable effect. It is concluded that in ammonium perchlorate propellents

the important reactions leading to ignition are heterogeneous rather than homogeneous, and that in a catalysed propellent the reaction of ammonia and perchloric acid on the surface of the catalyst is the significant reaction. The results are discussed in relation to current theories of the mechanism of the ignition of composite solid propellents containing ammonium perchlorate. (Author)

N66-30533 **Field 21I**
CFSTI Prices HC$7.00 MF$1.75
Trw Systems, Redondo Beach, Calif.
ONE-DIMENSIONAL TWO-PHASE REACTING GAS NONEQUILIBRIUM PERFORMANCE PROGRAM INTERIM ANALYSIS REPORT.
by S. S. Cherry, and J. R. Kliggel. 10 May 66, 319p NASA-CR-65417, TRW-5435-6009-RO-000
Contract NAS9-4358

Descriptors: *Computer program, *Inviscid flow, *Nozzle expansion, *One-dimensional flow, Chemical, Computer, Dimensional, Exhaust, Expansion, Flow, Gas, Inviscid, Mixture, Nonequilibrium, Nozzle, One, Phase, Program, Propellant, Reaction, Two.

For abstract, see STAR 04 17.

N66-30615 **Field 21I**
CFSTI Prices HC$1.00 MF$0.50
Mathematical Sciences Corp., Seattle, Wash.
FLEXIBLE CASE ANALYSIS FOR COMPRESSIBLE SOLID PROPELLANT GRAIN MOTORS STATUS REPORT.
by S. W. Key. Apr 66, 25p NASA-CR-76229, MSC-66-21-1
Contract NAS7-242

Descriptors: *Numerical analysis, *Propellant grain, *Ritz averaging method, Analysis, Average, Boundary, Configuration, Elasticity, Element, Elementary, Finite, Grain, Method, Numerical, Problem, Propellant, Region, Shell, Solid, Stiffness, Strain, Version.

For abstract, see STAR 04 17.

66-37139 **Field 21I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF PROPELLANT SLOSHING PARAMETERS OBTAINED FROM MODEL AND FULL-SIZE CENTAUR LIQUID-OXYGEN TANKS.
by A. J. Stofan. Sep 66, 14p NASA-TM-X-1286
Contract 891-01-00-06-22

Descriptors: *Centaur launch vehicle, *Liquid oxygen (lox), *Liquid sloshing, *Propellant tank, Damping, Liquid, Lox, Oxygen, Parameter, Pendulum, Propellant, Ratio, Sloshing, Tank, Test.

For abstract, see STAR 04 22.

N66-37598 **Field 21I**
CFSTI Prices HC$6.00 MF$1.50
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
PROGRAMMED METHOD FOR THE DETERMINATION OF PROPELLANT CHARACTERISTICS (MIXED EXPANSION).
Methode Programmee De Calcul Des Performances De Propergols (Detente Mixte)
by S. Barrere, B. Crampel, and M.-P. Lemaitre. 1965, 241p ONERA-TN-92
In French, English Summary

Descriptors: *Computer method, *Propellant property, Calculation, Composition, Computer, Equilibrium, Expansion, Fortran, Language, Machine, Mixing, Product, Program, Reaction, Technique, Throat.

For abstract, see STAR 04 22.

AD-640 893 **See Field 7B**

22. SPACE TECHNOLOGY

AD-431 728 **Field 22-**
CFSTI Price: HC$24.80
Aerospace Information Div., Library of Congress, Washington, D. C.
FUTURE LUNAR MISSIONS: REVIEW OF SOVIET AND SOVIET-BLOC LITERATURE.
AID work assignment no. 63.
8 Jan 64, 252p AID-P-64-1
TT-66-61896

Descriptors: (*Lunar bases, Bibliographies), (*Lunar craft, Bibliographies), (*Lunar trajectories, Bibliographies), Documentation, Reports, Launching, Rendezvous trajectories, Spacecraft docking, Orbital trajectories, Scientific satellites, Space stations, Lunar probes, Astronomical observatories, Astronauts, Astronautics, Public opinion, Manned spacecraft, Space capsules.

This report collects materials illustrating informed Soviet discussion of manned lunar flight in the period immediately preceding Khrushchev's 26 Oct 1963 disavowal of a crash man-on-the-moon program. Its purpose is to establish the possible patterns of thought of Soviet scientists and authoritative news commentators by the use of selected statements. Since no collection in this field can be thoroughly exhaustive, the criterion for selection of the individuals to be cited and the citations was their representative nature. With certain exceptions forced by time limitations, bio-bibliographic annotations are provided. In order to communicate most fully the impact of the original, the statements are translated rather than paraphrased. In most cases the materials quoted are from the 1961 to 1963 period, although earlier statements are occasionally reproduced when necessary to establish the pattern. (Author)

22A. ASTRONAUTICS

AD-640 958 **Field 22A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
MAN WENT INTO OUTER SPACE.
13 Apr 66, 6p FTD-TT-66-27
TT-66-62512
Unedited rough draft trans. of Grazhdanskaya Aviatsiya (USSR) n11 p15 1965.

Descriptors: (*Space flight, Motion pictures), USSR, Astronautics.

AD-641 287 **Field 22A, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
AN EVALUATION OF MAN'S CAPABILITY TO PERFORM SUPPORT FUNCTIONS IN SPACE,
by Chester B. May, and A. E. Holmes. 10 Oct 66, 12p AFAPL-CONF-67-4
Proj. AF-8170
Prepared in cooperation with Martin Co., Baltimore, Md. Prepared for presentation at the International Astronautical Congress (17th), Madrid, Spain, 10-15 October 1966.

Descriptors: (*Space maintenance, Performance (Human)), Spacecraft, Astronauts, Human engineering, Maintainability, Space tools.

As future space missions extend man's stay time in space past thirty days, support activities such as maintenance, assembly and resupply will become necessary. Development of this support technology must be integrated with development of advanced spacecraft systems. Analytical techniques and data on human performance limitations and support equipment capabilities are being developed so that support posture for a given mission can be optimized with the system development. Although programs have been conducted since 1960 in the investigation of specific areas such as special tools or accessory equipment, including orbital experiments for evaluation, much more development is needed before a true in-space support capability can be or does exist. (Author)

N66-30121 **Field 22A**
CFSTI Prices HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
PUBLICATIONS OF THE JET PROPULSION LABORATORY, JULY 1961 THROUGH JUNE 1962.
by S. L. Kresser, and R. J. Sippel. 15 Oct 62, 84p NASA-CR-76111, JPL-BIBL-39-3
Contract NAS7-100

Descriptors: *Abstract, *Bibliography, *Chemical engineering, *Communication system, *Electronic equipment, *Space vehicle, Annotation, Biology, Chemical, Communication, Computer, Dynamics, Electronic, Engineering, Equipment, Gas, Literature, Lunar, Maser, Planet, Propulsion, Radiation, Semiconductor, Spacecraft, System, Translation.

For abstract, see STAR 04 17.

N66-30178 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
APPROXIMATION OF REENTRY ANGLES OF ATTACK FOR A SPINNING BODY FROM RATE-GYRO AND ACCELEROMETER DATA.
by C. H. Whitlock. Jul 66, 42p NASA-TN-D-3492

Descriptors: *Accelerometer, *Angle of attack, *Gyroscope, *Spinning recovery, Aerodynamic, Angle, Approximation, Attack, Damping, Data, Earth, Force, Gravity, Rate, Recovery, Reentry, Roll, Rotation, Spin, Symmetry.

For abstract, see STAR 04 17.

N66-30296 **Field 22A**
CFSTI Prices HC$5.00 MF$1.25
Sperry Gyroscope Co., Great Neck, N. Y. Sperry Rand Systems Group.
SPACE STATION STABILIZATION AND CONTROL STUDY FINAL ENGINEERING REPORT.
by I.N. Hutchinson, R. Morrison, R. Steuer, and K. Thomson. Dec 63, 195p NASA-CR-66019, AB-1210-0020
Contract NAS1-2946

Descriptors: *Control simulator, *Space station, *Stabilization, Artificial, Booster, Configuration, Control, Coupling, Environment, Feasibility, Flexible, Generation, Gravity, Gyro, Manned, Model, Payload, Propellant, Rigid, Simulation, Spin.

For abstract, see STAR 04 17.

N66-30535 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PRELIMINARY INVESTIGATIONS OF SPACE MAINTENANCE.

by D. D. Mueller, J. S. Seeman, and F. H. Smith.
15 Jun 66, 35p NASA-TM-X-53246
Presented At Symp. On Spacesuits and Human Performance At Am. Psychological. Assoc. Ann. Conv., Los Angeles, 6 Sep. 1964, Sponsored By Soc. Of Eng. Psychologists

Descriptors: *Human performance, *Pressurized suit, *Space maintenance, Earth, Flight, Gravity, Ground, Human, Limit, Parabolic, Performance, Psychomotor, Removal, Solenoid, Space, Suit, Task, Test, Valve, Zero.

For abstract, see STAR 04 17.

N66-30540 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
APPLICATION OF DOUBLE-AVERAGED EQUATIONS OF SATELLITE MOTION TO A LUNAR ORBITER.
by J. Lorell. 30 Jun 66, 20p NASA-CR-76200, JPL-TM-33-287
Contract NAS7-100

Descriptors: *Lunar orbiter, *Motion equation, *Satellite, Application, Artificial, Average, Body, Double, Earth, Equation, Instability, Lifetime, Lunar, Motion, Orbit, Perturbation, Sun, Third.

For abstract, see STAR 04 17.

N66-31227 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Washington, D. C.
CERTAIN RESULTS OF OBSERVATIONS TAKEN DURING THE SPACE FLIGHT OF THE VOSKHOD.
Quelques Resultats D'observations Effectuees Au Cours Du Vol Cosmique Du Voskhod
by K. P. Feoktistov, G. Rozenberg, A. B. Sandomirskiy, V. N. Sergeyevich, and D. M. Sonechkin.
Aug 65, 20p NASA-TT-F-9551
Trans. Into English Of A Paper Presented At The 8th Plenary Meeting And 6th Intern. Space Sci. Symp. Cospar, Buenos Aires, 10-21 May 1965

Descriptors: *U.S.S.R. space program, *Visual observation, *Voskhod manned spacecraft, Atmosphere, Aureole, Cloud, Cover, Earth, Experiment, Horizon, Manned, Observation, Particle, Photography, Photometry, Program, Solar, Space, Spacecraft, U.s.s.r., Upper, Visual.

For abstract, see STAR 04 17.

N66-31351 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
DYNAMIC-MODEL STUDY OF PLANETARY-ENTRY CONFIGURATIONS IN THE LANGLEY SPIN TUNNEL.
by P. J. Costigan. Jul 66, 23p NASA-TN-D-3499

Descriptors: *Atmospheric entry, *Dynamic model, *Low speed stability, *Planetary atmosphere, *Space probe, Atmosphere, Blunt, Characteristics, Cone, Configuration, Descent, Drag, Dynamic, Entry, Hemisphere, Low speed, Model, Planetary, Probe, Shell, Space, Sphere, Spin, Stability, Subsonic, Tunnel, Vertical.

For abstract, see STAR 04 17.

N66-31385 **Field 22A**
CFSTI Prices HC$7.17 MF$2.00
Electro-mechanical Research, Inc., Sarasota, Fla. Telemetry Div.
STUDY OF LUNAR GEOPHYSICAL SURFACE AND SUBSURFACE PROBES FOR APOLLO APPLICATION PROGRAM. VOLUME II - DETAILED TECHNICAL REPORT.
by W. Knopik. Jun 66, 417p NASA-CR-76413
Contract NAS8-20243

Descriptors: *Apollo project, *Lunar surface, *Systems design, Design, Electric, Experiment, Geophysics, Instrumentation, Lunar, Measurement, Mechanical, Mission, Nuclear, Optical, Probe, Property, Subsurface, Surface, System, Thermal.

For abstract, see STAR 04 17.

N66-31668 **Field 22A**
CFSTI Prices HC$3.00 MF$0.75
Trw Systems, Redondo Beach, Calif.
CONCEPTUAL DESIGN STUDY FOR A MARS ENTRY VEHICLE DAMPER.
by R. A. Winje. Jul 66, 79p NASA-CR-525
Contract NAS5-9198

Descriptors: *Angle of attack, *Damping, *Mars probe, *Space vehicle, *Trajectory control, Control, Criterion, Design, Entry, Mars, Oscillation, Parameter, Probe, Space, Trajectory, Vehicle.

For abstract, see STAR 04 17.

N66-31702 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
Lockheed Missiles And Space Co., Huntsville, Ala. Huntsville Research And Engineering Center.
RESEARCH IN STABILITY OF PERIODIC MOTIONS QUARTERLY PROGRESS REPORT, 3 FEB. - 4 MAY 1966.
by D. L. Hitzl, and J. White. 1966, 25p NASA-CR-76423, LMSC/HREC-A782770
Contract NAS8-20323

Descriptors: *Cauchy problem, *Celestial mechanics, *Hamiltonian, *Motion equation, *Periodic orbit, Celestial, Equation, Existence, Existence theorem, Hamilton-jacobi equation, Mechanics, Motion, Orbit, Periodic, Problem, Solution, Stability, Theory.

For abstract, see STAR 04 17.

N66-31852 **Field 22A**
CFSTI Prices HC$3.75 MF$1.25
Aeronutronic, Newport Beach, Calif.
FEASIBILITY STUDY FOR LUNAR WORM PLANETARY ROVING VEHICLE CONCEPT FINAL TECHNICAL REPORT.
by F. A. Dobson, and D. G. Fulton. 27 Jul 66, 202p NASA-CR-66098, RSC-6720
Contract NAS1-5709

Descriptors: *Bellows, *Lunar roving vehicle (lrv), *Mobility, *Structural design, Contraction, Extension, Lrv, Lunar, Planetary, Rib, Roving, Shelter, Travel, Vehicle, Walking, Wave, Worm.

For abstract, see STAR 04 17.

N66-31886 **Field 22A**
CFSTI Prices HC$7.28 MF$3.25
General Dynamics/fort Worth, Tex. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
A STUDY OF JUPITER FLYBY MISSIONS FINAL TECHNICAL REPORT.
by L. E. Hove. 17 May 66, 678p NASA-CR-76461, FZM-4625
Contracts NAS7-100, JPL-951285
Prepared For Jpl

Descriptors: *Flyby mission, *Jupiter (planet), *Mission planning, *Spacecraft design, Communications, Control, Cosmic, Cost, Design, Dust, Field, Flyby, Guidance, Magnetic, Mechanical, Meteoroid, Mission, Navigation, Penetration, Planet, Planning, Plasma, Propulsion, Protection, Radiation, Spacecraft, Spectrometry, Thermal.

For abstract, see STAR 04 17.

N66-31888 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
FLIGHT OF THE INTERPLANETARY AUTOMATIC STATIONS " VENUS-2" AND " VENUS-3".
O Polete Avtomaticheskikh Mezhplanetnykh Stantsiy "venera-2" I "venera-3"
14 Mar 66, 20p NASA-CR-76460, ST-PR-LPS-10457
Contract NAS5-9299
Transl. Into English From Pravda (Moscow), No. 65, 6 Mar. 1966

Descriptors: *Flyby mission, *Interplanetary space, *Planetary surface, *Venus probe, Atmosphere, Command, Communication, Correction, Flyby, Guidance, Interplanetary, Landing, Measurement, Mission, Motion, Photograph, Planet, Pressure, Probe, Radio, Soft, Space, Surface, System, Telemetry, Temperature, Trajectory, Venus.

For abstract, see STAR 04 17.

N66-31889 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
HIGHLIGHTS OF THE PRESS CONFERENCE AT THE MOSCOW HOUSE OF SCIENTISTS ON 10 FEBRUARY 1966.
Press-konferentsiya V Moskovskom Dome Uchenykh
17 Feb 66, 13p NASA-CR-76469, ST-PR-LPS-10448
Contract NAS5-9299
Transl. Into English From Pravda (Moscow), No. 42, 11 Feb. 1966

Descriptors: *Lunar landing, *Soft landing, *Television camera, Camera, Composition, Flow, Formation, Landing, Lava, Lunar, Moon, Photography, Probe, Property, Soft, Surface, Television.

For abstract, see STAR 04 17.

N66-31900 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Washington, D. C.
MANNED SPACE FLIGHT 1966.
1966, 34p NASA-TM-X-57746

Descriptors: *Manned space flight, *Mission planning, *Program management, Apollo project, Cost, Flight, Gemini project, Launch vehicle, Management, Manned, Mission, Moon, Planning, Program, Space, Space vehicle, Thrust.

For abstract, see STAR 04 17.

N66-32292 **Field 22A**
CFSTI Prices HC$2.50 MF$0.75
Iit Research Inst., Chicago, Ill. Astro Sciences Center.
STUDIES AND ANALYSES OF SPACE SCIENCE PROBLEMS RELATED TO THE PLANNING AND DIRECTING OF NASA LUNAR AND PLANETARY PROGRAMS THIRD ANNUAL SUMMARY REPORT, JUL. 1965 - JUN. 1966.
Jun 66, 74p NASA-CR-76732, A-3
Contract NASR-65/06/

Descriptors: *Cost estimate, *Lunar program, *Mission planning, *Nasa program, *Planetary exploration, Asteroid, Comet, Cost, Distribution, Estimate, Exploration, Lunar, Mission, Planetary, Planning, Program, Satellite, Scheduling, Science, Space, Spacecraft, Trajectory.

For abstract, see STAR 04 17.

N66-32337 **Field 22A**
CFSTI Prices HC$4.25 MF$2.00
Trw Systems, Redondo Beach, Calif.
N-BODY MONTE CARLO SIMULATION OF SPECIFIC LUNAR ORBITER MISSIONS.
by J. J. Cohen, and D. C. Leonard. 1 Mar 66. 363p NASA-CR-66055, TRW-2854-6015-RO-000
Contract NAS1-4605

Descriptors: *Computer simulation, *Lunar orbiter, *Mathematical model, *Monte carlo method, Computer, Dispersion, Lunar, Mathematics, Mission, Model, Orbital, Program, Simulation, Spacecraft, Trajectory.

For abstract, see STAR 04 17.

N66-32429 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. Of Aeronautics And Astronautics.
THE ATTITUDE CONTROL OF A SATELLITE IN AN ELLIPTIC ORBIT.
by R. A. Busch, and I. Fluegge-lotz. Apr 66. 42p NASA-CR-76751, SUDAAR-261
Grant NSG-133-61

Descriptors: *Computer simulation, *Elliptical orbit, *Linear equation, *Orbital calculation, *Satellite attitude control, Attitude, Calculation, Computer, Control, Eccentricity, Ellipse, Equation, Linear, Motion, Optimum, Orbit, Pitch, Roll, Satellite, Simulation.

For abstract, see STAR 04 17.

N66-36783 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
Goodyear Aerospace Corp., Akron, Ohio.
COMPUTER STUDY TO DETERMINE THE EFFECT OF BALLOON FOOTPRINT AND OPTICAL CHARACTERISTICS ON MATERIAL TEMPERATURES OF A SPHERE ON THE LUNAR SURFACE FOR HIGH-NOON CONDITION.
Jan 66. 38p NASA-CR-66166, GER-12577
Contract NAS1-5778

Descriptors: *Balloon, *Lunar surface, *Optical property, *Temperature distribution, Characteristic, Computer, Distribution, Footprint, Lunar, Material, Optical, Property, Sphere, Surface, Temperature.

For abstract, see STAR 04 22.

N66-37037 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
ON THE USE OF EULER'S THEOREM ON ROTATIONS FOR THE SYNTHESIS OF ATTITUDE CONTROL SYSTEMS.
by G. Meyer. Sep 66. 37p NASA-TN-D-3643

Descriptors: *Attitude control, *Euler equation, *Rotation, Attitude, Classical, Control, Eigenvector, Jet, Matrix, Mechanics, Motion, Nonlinear, Orbiting astronomical observatory (oao), Reaction, Synthesis, Torque, Vehicle, Wheel.

For abstract, see STAR 04 22.

N66-37501 **Field 22A, 14A, 5A**
CFSTI Prices HC$2.00 MF$0.50
Technische Univ., Berlin (West Germany). Institut Fuer Raumfahrttechnik.
A PROCEDURE TO MEASURE THE WORTH OF SPACE PROGRAMS.
by H. H. Koelle. 15 Jul 65, 37p TUB-IR-1965/2

Descriptors: *Decision making, *Space program, *Transportation, Analysis, Cost, Evaluation, Launch vehicle, Management, Objective, Planning, Program, Research, Resource, Space flight, Yield.

For abstract, see STAR 04 22.

AD-640 725 **See Field 3B**

AD-640 818 **See Field 17G**

AD-640 864 **See Field 15D**

AD-640 865 **See Field 18F**

AD-641 113 **See Field 6S**

22B. SPACECRAFT

AD-469 695 **Field 22B, 16D**
CFSTI Prices: HC$4.60 MF$0.50
Army Missile Command, Redstone Arsenal, Ala. Structures and Mechanics Lab.
DEVELOPMENT OF A RECOVERY BODY FOR THE AMRAD PROJECT.
by H. C. Tom. 15 Aug 65, 42p RS-TR-65-6
ARPA Order-198

Descriptors: (*Reentry vehicles, Design), Nose cones, Recovery, Recording systems, Instrumentation, Test vehicles, Deceleration, Parachute descents, Radio beacons, Radar reflectors, Drop testing, Effectiveness, Tapes, Hypersonic test vehicles, Flash lamps, Visual signals.

This report describes the design and development of the AMRAD Target Project, Experiment 1, recovery body which is used to return a tape recorder containing valuable research data from a suborbital missile flight flown to investigate radar re-entry phenomena. Both impact-type bodies utilizing no deceleration devices or location aids and parachute-type recovery bodies were evaluated. The final design was a recoverable nose cone utilizing a colored, radar-reflective, metallized parachute, a radio beacon, and a flashing light (for night missions) as recovery aids. High-altitude drop tests from 45,000 feet under nighttime conditions confirm the workability of the design. (Author)

AD-640 649 **Field 22B, 5I**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
A LOW COST COMMUNICATION SATELLITE EDUCATIONAL SYSTEM.
Professional paper,
by Irving Dlugatch. 15 Aug 66, 11p SP-2493

Descriptors: (*Communication satellites (Active), *Education), Systems engineering, Cost effectiveness, Television equipment, Transmitter-receivers, Spacecraft.

The report discusses the potential of satellites for education and applies the principles of system engineering to studies of system implementation and cost effectiveness. The proposed system makes use of television and of a space vehicle, and excels by the modesty of its transmitter and receiver requirements on the ground and on the spacecraft.

AD-640 727 **Field 22B, 6K, 13A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SELECTION OF A RATIONAL DIAGRAM FOR A COOLING SYSTEM IN SPACE,
by O. N. Favorskii. 27 Jun 66, 16p FTD-MT-66-30
TT-66-62498
Edited machine trans. of Akademiya Nauk SSSR, Izvestiya. Energetika i Transport, n1 p143-50 1966.

Descriptors: (*Closed ecological systems, Cooling), (*Spacecraft cabins, Cooling), Selection, Thermal radiation, Mathematical analysis, USSR.

Expressions are given for determination of basic parameters that characterize space cooling systems: specific area of radiator and specific power. Optimum parameters of diagrams are shown and a comparison is given of diagrams for optimum parameters using specific examples. (Author)

N66-30123 **Field 22B**
CFSTI Prices HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
EFFECTS OF ENERGY DISSIPATION ON THE FREE BODY MOTIONS OF SPACECRAFT.
by P. W. Likins. 1 Jul 66, 77p NASA-CR-76114, JPL-TR-32-860
Contract NAS7-100

Descriptors: *Deformation, *Energy dissipation, *Spacecraft structure, Analysis, Angular, Body, Damping, Dissipation, Energy, Flexible, Free, Mode, Momentum, Motion, Spacecraft, Structural, Structural analysis, Structure.

For abstract, see STAR 04 17.

N66-30258 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
GEMINI SPACECRAFT PARACHUTE LANDING SYSTEM.
by J. Vincze. Jul 66, 45p NASA-TN-D-3496

Descriptors: *Drogue parachute, *Gemini spacecraft, *Landing system, *Parachute, Attenuation, Conical, Drogue, Entry, Landing, Pilot, Positioning, Ribbon, Ring, Sail, Shock, Spacecraft, System, Water.

For abstract, see STAR 04 17.

N66-30327 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ANALYSIS OF THE MOTION OF A SATELLITE-REACTION WHEEL ASSEMBLY OPTIMIZED FOR WEIGHT AND POWER.
by C. R. Hayleck Jr. Dec 65, 33p NASA-TM-X-55503, X-723-65-494

Descriptors: *Reaction wheel, *Satellite rotation, *Spacecraft motion, Analysis, Axis, Conservation, Maneuver, Momentum, Motion, Reaction, Rotation, Satellite, Spacecraft, Spin, Wheel.

For abstract, see STAR 04 17.

N66-30331 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BASIC DESIGN CONSIDERATIONS FOR A SMALL SCIENTIFIC SATELLITE.
by W. Logan. Mar 66, 14p NASA-TM-X-55508, X-723-66-97

Descriptors: *Ground support equipment, *Launch vehicle, *Scientific satellite, *Spacecraft design, *Transportation, Consideration,

Design, Development, Equipment, Ground, Handling, Interface, Satellite, Science, Small, Spacecraft, Support.

For abstract, see STAR 04 17.

N66-30337 Field 22B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A SYSTEM FOR ORIENTING BALLOON PAYLOADS IN SPACE.
by S. M. Derdeyn, and D. A. Kniffen. Mar 66, 19p NASA-TM-X-55514, X-611-66-116
Submitted For Publication

Descriptors: *Balloon, *Celestial sphere, *Detector, *Payload, Celestial, Drift, Earth, Flight, Orientation, Rotation, Sensor, Solar, Space, Sphere, Sun, Wind.

For abstract, see STAR 04 17.

N66-30340 Field 22B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A TIMING EXPERIMENT USING THE GEOS SATELLITE OPTICAL BEACON.
by J. E. Moye. Mar 66, 45p NASA-TM-X-55517, X-524-66-149

Descriptors: *Beacon, *Flash, *Geodetic satellite, *Timing, *Xenon light, Apparatus, Beam, Cesium, Clock, Lamp, Light, Optical, Photoelectric, Standard, Synchronization, Xenon.

For abstract, see STAR 04 17.

N66-30343 Field 22B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BIOLOGICAL DECONTAMINATION OF A SPACECRAFT SYSTEM.
by F. N. Le doux. Apr 66, 21p NASA-TM-X-55520, X-723-66-155
Presented At The Am. Assoc. For Contamination Control Conf., Houston, Tex., 31 Mar. 1966 Submitted For Publication

Descriptors: *Decontamination, *Isopropyl alcohol, *Lunar spacecraft, *Spacecraft sterilization, *Xylene, Circuit, Electronic, Isopropyl, Lunar, Network, Organism, Spacecraft, Sterilization, Viability.

For abstract, see STAR 04 17.

N66-30358 Field 22B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DETERMINATION OF ACCURATE TIME ON OSO-I.
by W. E. Behring. May 66, 16p NASA-TM-X-55535, X-614-66-212

Descriptors: *Clock, *Measuring apparatus, *Oso- i, *Time measurement, Analysis, Apparatus, Computer, Data, Measurement, Measuring, Observatory, Orbit, Program, Record, Solar, Time.

For abstract, see STAR 04 17.

N66-30530 Field 22B
CFSTI Prices HC$4.00 MF$0.75
Atkins And Merrill, Inc., Sudbury, Mass.
FEASIBILITY STUDY OF CONSTRUCTING A 1/10 SCALE APOLLO SERVICE MODULE SIMILITUDE MODEL FINAL REPORT.
by C. T. Rembetsy. De 66, 119p NASA-CR-65426
Contract NAS9-4567

Descriptors: *Apollo spacecraft, *Scale model, *Service module, Aerodynamics, Beam, Boost, Compression, Construction, Core, Damping, Density, Feasibility, Flight, Honeycomb, Joint, Model, Panel, Pressure, Sandwich, Scale, Spacecraft, Stiffness.

For abstract, see STAR 04 17.

N66-30544 Field 22B
CFSTI Prices HC$3.00 MF$0.75
Little (Arthur D.), Inc., Cambridge, Mass.
THERMAL SCALE MODELING OF THE TEMPERATURE CONTROL MODEL OF MARINER MARS 64.
by F. Gabron, and R. W. Johnson. 25 Jan 65, 92p NASA-CR-76213, C-66326
Contract JPL-950789
Prepared For Jpl

Descriptors: *Mariner space probe, *Scale model, *Temperature control, Assembly, Bus, Chamber, Control, Equilibrium, Heat, Leakage, Louver, Model, Scale, Shield, Temperature, Thermal, Vacuum.

For abstract, see STAR 04 17.

N66-30761 Field 22B
CFSTI Prices HC$3.00 MF$0.75
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
SUNBLAZER STATE DETERMINATION INVESTIGATION.
by D. O. Madl. May 66, 84p NASA-CR-76312, CSR-T-66-4
Contract NASR-249

Descriptors: *Solar probe, *Sunblazer space probe, Angle, Azimuth, Corona, Data, Dynamics, Elevation, Estimation, Orbital, Position, Probe, Processing, Range, Rate, Solar, State, Velocity.

For abstract, see STAR 04 17.

N66-30762 Field 22B
CFSTI Prices HC$1.00 MF$0.50
Iit Research Inst., Chicago, Ill. Astro Sciences Center.
SPACECRAFT PROGRAM COST ESTIMATING MANUAL.
by W. P. Finnegan, and C. A. Stone. May 66, 20p NASA-CR-76263, C-7
Contract NASR-65/06/

Descriptors: *Cost estimate, *Spacecraft design, Cost, Data, Design, Equation, Estimate, Flight, Handling, Manufacturing, Mariner program, Model, Nomograph, Program, Propulsion, Prototype, Spacecraft, Structure, Subsystem, Telecommunication, Weight.

For abstract, see STAR 04 17.

N66-30788 Field 22B
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
AN INITIAL CONCEPT OF A MANNED MARS EXCURSION VEHICLE FOR A TENUOUS MARS ATMOSPHERE.
by G. R. Woodcock. 7 Jun 66, 55p NASA-TM-X-53475

Descriptors: *Atmospheric entry, *Manned spacecraft, *Mars spacecraft, Aerodynamic, Ascent, Atmosphere, Atmospheric, Braking, Entry, Excursion, Landing, Manned, Mars (planet), Mass, Model, Planetary, Rocket, Spacecraft, Thin, Vehicle.

For abstract, see STAR 04 17.

N66-30883 Field 22B
CFSTI Prices HC$1.00 MF$0.50
Centre National De Recherches De L. Espace, Brussels (Belgium).
CONCERNING SATELLITE S66.
Au Sujet Du Satellite S66
by J.-L. Van eck. Apr 63, 14p NASA-CR-76377
In French. English Summary Presented At Congr. Intern. D'electronique Quantique, Paris, 13 Feb. 1963 Sponsored By Nasa Its Note Preliminaire No. 26

Descriptors: *Be-a, *Beacon satellite, *Laser, *Satellite instrumentation, Analysis, Beacon explorer-a, Conference, Density, Electron, Electronics, Guidance, Instrumentation, Ionospheric, Noise, Optical, Ratio, Reflector, S-66, Satellite, Signal, Tracking.

For abstract, see STAR 04 17.

N66-31211 Field 22B
CFSTI Prices HC$6.00 MF$1.25
Goodyear Aerospace Corp., Akron, Ohio.
DESIGN STUDIES OF ADVANCED LENTICULAR PASSIVE COMMUNICATION SATELLITES FROM LOW TO SYNCHRONOUS ORBIT REPORT, MAY - SEP. 1965.
Jul 66, 211p NASA-CR-503
Contract NAS1-3114

Descriptors: *Gravity gradient satellite, *Lenticular body, *Satellite design, *Spacecraft stability, Altitude, Angle, Body, Characteristics, Communication, Configuration, Curvature, Damping, Design, Effect, Element, Gradient, Gravity, Lenticular, Orbit, Orbital, Passive, Physical, Radius, Satellite, Synchronous, Variation.

For abstract, see STAR 04 17.

N66-31367 Field 22B
CFSTI Prices HC$3.00 MF$0.75
Bell Aerosystems Co., Buffalo, N. Y.
STUDY OF DIFFERENTIAL ATTITUDE ENGINE ON-TIME CONTROL TO OBTAIN EXTREMELY LOW LIMIT CYCLE RATES FINAL REPORT, 29 JUN. 1965 - 30 APR. 1966.
by R. P. Kaiser, J. F. Mark, and D. C. Neil. Apr 66, 95p NASA-CR-76388
Contract NAS8-20212
Its Rept.-2309-950001

Descriptors: *Attitude control, *Jet engine, *Reaction jet, *Space vehicle control, Acceleration, Attitude, Computer, Control, Cycle, Differential, Engine, Environment, Evaluation, Jet, Logic, Mission, Reaction, Roll, Sensor, Space vehicle, Thrustor, Yaw.

For abstract, see STAR 04 17.

N66-31816 Field 22B
CFSTI Prices HC$3.75 MF$1.25
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME I - SUMMARY FINAL REPORT.
11 May 66, 203p NAA-CR-66128, AVSSD-0006-66-RR, VOL. I
Contract NAS1-5224

Descriptors: *Interplanetary trajectory, *Mars probe, *Systems design, Approach, Component, Concept, Design, Entry, Interplanetary, Landing, Mars, Mission, Mode,

Orbit, Probe, Spacecraft, Spacecraft sterilization, Sterilization, Subsystem, System, Trajectory.

For abstract, see STAR 04 17.

N66-31817 **Field 22B**
CFSTI Prices HC$4.25 MF$1.75
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME II - PROBE/LANDER, ENTRY FROM THE APPROACH TRAJECTORY. BOOK 1 - SYSTEM DESIGN FINAL REPORT.
11 May 66, 327p NASA-CR-66129, AVSSD-0006-66-RR, V. II, BK-1
Contract NAS1-5224

Descriptors: *Atmospheric entry, *Mars probe, *Spacecraft landing, *Systems design, Analysis, Atmospheric, Capsule, Configuration, Design, Entry, Failure, Flight, Instrumentation, Landing, Launch, Operation, Probe, Shell, Spacecraft, Subsystem, System.

For abstract, see STAR 04 17.

N66-31818 **Field 22B**
CFSTI Prices HC$3.25 MF$1.00
Avco Corp., Lowell, Mass. Space System Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME II - PROBE/ LANDER, ENTRY FROM THE APPROACH TRAJECTORY. BOOK 2 - MISSION AND SYSTEM SPECIFICATIONS FINAL REPORT.
by T. R. Ellis. 11 May 66, 153p NASA-CR-66130, AVSSD-0006-66-RR, V. II, BK-2
Contract NAS1-5224

Descriptors: *Interplanetary trajectory, *Mars probe, *Mission planning, *Space capsule, Approach, Capsule, Design, Flight, Interplanetary, Landing, Mars, Mission, Planning, Probe, Space, Specification, System, Trajectory.

For abstract, see STAR 04 17.

N66-31819 **Field 22B**
CFSTI Prices HC$4.25 MF$1.75
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME III - PROBE, ENTRY FROM ORBIT. BOOK 1 - SYSTEM DESIGN FINAL REPORT.
by T. R. Ellis. 11 May 66, 302p NASA-CR-66131, AVSSD-0006-66-RR, V. III, BK-1
Contract NAS1-5224

Descriptors: *Mars probe, *Orbital launch, *Planetary atmosphere, *Systems design, Atmosphere, Design, Engineering, Entry, Experiment, Landing, Launch, Mars, Mission, Orbit, Orbital, Planetary, Probe, Property, Spacecraft, System, Terrain.

For abstract, see STAR 04 17.

N66-31820 **Field 22B**
CFSTI Prices HC$4.25 MF$1.75
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME III - PROBE ENTRY FROM ORBIT. BOOK 2 - MISSION SYSTEM AND SUBSYSTEM SPECIFICATIONS FINAL REPORT.
by T. R. Ellis. 11 May 66, 303p NASA-CR-66132, AVSSD-0006-66-RR, V. III, BK-2
Contract NAS1-5224

Descriptors: *Mars probe, *Space mission, *Spacecraft design, *Subsystem, Capsule, Component, Design, Equipment, Flight, Mars, Mission, Orbit, Planetary, Probe, Space, Spacecraft, Specification, Support, System, Vehicle.

For abstract, see STAR 04 17.

N66-31821 **Field 22B**
CFSTI Prices HC$3.75 MF$1.25
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME III - PROBE, ENTRY FROM ORBIT. BOOK 3 - DEVELOPMENT TEST PROGRAMS FINAL REPORT.
by W. P. Neacy. 11 May 66, 235p NASA-CR-66133, AVSSD-0006-66-RR, V. III, BK-3
Contract NAS1-5224

Descriptors: *Flight test, *Ground test, *Mars probe, *Test program, Attitude, Canister, Control, Entry, Flight, Ground, Heat, Parachute, Program, Propulsion, Separation, Shell, Shield, Space vehicle, Sterilization, Subsystem, Test, Vehicle.

For abstract, see STAR 04 17.

N66-31822 **Field 22B**
CFSTI Prices HC$3.75 MF$1.25
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME IV - STERILIZATION FINAL REPORT.
by W. J. Schafer. 11 May 66, 224p NASA-CR-66134, AVSSD-0006-66-RR, VOL. IV
Contract NAS1-5224

Descriptors: *Contamination, *Mars probe, *Spacecraft sterilization, Application, Assay, Biological, Calculation, Canister, Component, Control, Heat, Material, Monitor, Spacecraft, Sterilization, Training.

For abstract, see STAR 04 17.

N66-31824 **Field 22B**
CFSTI Prices HC$10.18 MF$4.00
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME V SUBSYSTEM AND TECHNICAL ANALYSES. BOOK 2 - AEROMECHANICS AND THERMAL CONTROL FINAL REPORT.
by R. M. Davis. 11 May 66, 868p NASA-CR-66136, AVSSD-0006-66-RR, VOL. V, BK-2
Contract NAS1-5224

Descriptors: *Atmospheric entry, *Conical shell, *Mars probe, *Spacecraft design, *Thermal environment, Aerodynamics, Approach, Atmospheric, Cone, Control, Design, Entry, Environment, Mars, Orbit, Planet, Probe, Shell, Spacecraft, Structure, Thermal, Thermodynamics, Trajectory.

For abstract, see STAR 04 17.

N66-31846 **Field 22B**
CFSTI Prices HC$5.27 MF$2.25
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME V - SUBSYSTEM AND TECHNICAL ANALYSES. BOOK 4 - INSTRUMENTATION FINAL REPORT.
11 May 66, 477p NASA-CR-66138, AVSSD-0006-66-RR, VOL. V, BK-4
Contract NAS1-5224

Descriptors: *Instrumentation, *Mars probe, *Payload, Chromatograph, Density, Entry, Interface, Mars, Orbit, Probe, System, Television, Trajectory.

For abstract, see STAR 04 17.

N66-31847 **Field 22B**
CFSTI Prices HC3.75 MF$1.50
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME V - SUBSYSTEM AND TECHNICAL ANALYSES. BOOK 5 - ATTITUDE CONTROL AND PROPULSION FINAL REPORT.
11 May 66, 252p NASA-CR-66139, AVSSD-0006-66-RR, VOL. V, BK-5
Contract NAS1-5224

Descriptors: *Attitude control, *Mars probe, *Propulsion system, Approach, Attitude, Close, Control, Engine, Landing, Loop, Mars, Orbit, Probe, Propulsion, System, Trajectory, Velocity.

For abstract, see STAR 04 17.

N66-31848 **Field 22B**
CFSTI Prices HC$3.75 MF$1.50
Avco Corp., Lowell, Mass. Space Systems Div.
COMPARATIVE STUDIES OF CONCEPTUAL DESIGN AND QUALIFICATION PROCEDURES FOR A MARS PROBE/LANDER. VOLUME V - SUBSYSTEM AND TECHNICAL ANALYSES. BOOK 6 - MECHANICAL SUBSYSTEMS FINAL REPORT.
11 May 66, 286p NASA-CR-66140, AVSSD-0006-66-RR, VOL. V, BK-6
Contract NAS1-5224

Descriptors: *Mars probe, *Subsystem, Analysis, Entry, Impact, Mars, Mechanical, Orbit, Parachue, Pressurization, Probe, Trajectory.

For abstract, see STAR 04 17.

N66-31891 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
SOVIET PRESS COMMUNIQUES AND THE PRAVDA EDITORIAL ON " LUNA-9" SOFT LANDING ON THE MOON.
10 Feb 66, 21p NASA-CR-76466, ST-PR-10445
Contract NAS5-3760
Transl. Into English From Pravda And Komsomol'skaya Pravda (Moscow), 4-5 Feb. 1966

Descriptors: *Lunar landing site, *Photographic recording, *Radio transmission, *Soft landing, Braking, Condition, Correction, Geography, Impact, Landing, Lunar, Marine, Module, Moon, Photograph, Probe, Radio, Recording, Rocket engine, Scanning, Site, Soft, Surface, Telemeter, Trajectory, Transmission.

For abstract, see STAR 04 17.

N66-31934 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE SITUATION REPORT, VOLUME 6, NUMBER 10.
31 May 66, 28p NASA-TM-X-57745, X-512-66-51, VOL. 6, NO. 10

Descriptors: *Orbiting satellite, *Table, Apogee, Decay, Frequency, Inclination, Launch, Orbit, Perigee, Period, Satellite, Space vehicle, Transmission.

For abstract, see STAR 04 17.

N66-32044 Field 22B
CFSTI Prices HC$7.00 MF$5.00
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PUBLICATIONS OF GODDARD SPACE FLIGHT CENTER, 1963. VOLUME II - SPACE TECHNOLOGY.
1963, 1084p NASA-TM-X-57738

Descriptors: *Communications satellite, *Meteorological satellite, *Optical rangefinder, *Planetary atmosphere, *Satellite attitude control, *Space probe, *Spacecraft sensor, *Technology (gen), Astronomical telescope, Astronomy, Attitude, Communication, Control, Environment, Laboratory, Meteorology, Orbit, Planet, Research, Satellite, Sensor, Space, Spacecraft, System, Test, Tracking.

For abstract, see STAR 04 17.

N66-32258 Field 22B
CFSTI Prices HC$2.00 MF$0.50
Schjeldahl (G. T.) Co., Northfield, Minn.
DEVELOPMENT OF A 425 FOOT DIAMETER PASSIVE COMMUNICATION SATELLITE WITH SELF-ERECTING PROPERTIES QUARTERLY PROGRESS REPORT NO. 8 AND MONTHLY PROGRESS REPORT, MAY 1966.
by W. Jacobi. 1966, 36p NASA-CR-76677
Contract NAS5-3943

Descriptors: *Communications satellite, *Expandable structure, *Passive satellite, *Satellite design, Aluminum, Coating, Communication, Cylinder, Deployment, Design, Erection, Material, Passive, Rigidity, Rubber, Satellite, Self-erecting, Silicone.

For abstract, see STAR 04 17.

N66-32301 Field 22B
CFSTI Prices HC$2.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
THE DECAY OF SATELLITE 1965-79 A.
by W. P. Hirst. 10 Jun 66, 47p NASA-CR-76688, SAO SPECIAL REPT.-214
Grant NSG-563

Descriptors: *Satellite observation, *Tracking study, Decay, Ephemeris, Impact, Observation, Residual, Satellite, Study, Tracking.

For abstract, see STAR 04 17.

N66-32669 Field 22B
CFSTI Prices HC$3.00 MF$1.00
Little (Arthur D.), Inc., Cambridge, Mass.
THERMAL SCALE MODELING TECHNIQUES FOR VOYAGER-TYPE SPACECRAFT.
by F. Gabron. 15 Jun 66, 149p NASA-CR-76942, C-66326-02
Contracts NAS7-100, JPL-951417
Prepared For Jpl

Descriptors: *Scale model, *Spacecraft model, *Thermal property, *Voyager project, Capsule, Design, Entry, Environment, Equilibrium, Feasibility, Model, Property, Scale, Simulation, Space, Spacecraft, Technique, Temperature, Thermal.

For abstract, see STAR 04 17.

N66-36691 Field 22B
CFSTI Prices HC$7.00 MF$2.00
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
FIRST AEROSPACE MECHANISMS SYMPOSIUM.
1966, 361p NASA-CR-77971
Contract NAS7-100

Symp. Held Santa Clara, Calif., 19-20 May 1966, Sponsored In Part By Santa Clara Univ. And Lockheed Missiles And Space Co.

Descriptors: *Aerospace technology, *Conference, *Damper, *Impact tolerance, *Sensor, *Solar cell, *Spacecraft instrumentation, Aerospace, Cell, Impact, Instrumentation, Solar, Spacecraft, Technology, Tolerance.

For abstract, see STAR 04 22.

N66-36858 Field 22B
CFSTI Prices HC$2.50 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
MARINER MARS 1964 FLIGHT DYNAMIC DATA.
by J. E. Randolph. 15 Sep 66, 86p NASA-CR-78054, JPL-TM-33-278, REV. 1
Contract NAS7-100
Revision 1

Descriptors: *Dynamic response, *Mars spacecraft, *Telemetry, *Umbilical tower, Dynamic, Environment, Launch complex, Mariner iii space probe, Mariner iv space probe, Mars, Microphone, Payload, Probe, Response, Space, Spacecraft, Tower, Transducer, Umbilical, Vibration.

For abstract, see STAR 04 22.

N66-37028 Field 22B
CFSTI Prices HC$2.50 MF$0.75
Michigan Univ., Ann Arbor.
PEACEFUL USES OF EARTH-OBSERVATION SPACECRAFT. VOLUME I - INTRODUCTION AND SUMMARY.
Sep 66, 71p NASA-CR-586
Contract NASW-1084

Descriptors: *Earth orbit, *Economics, *Satellite observation, *Scientific satellite, Agriculture, Earth, Geography, Life, Observation, Oceanography, Orbit, Satellite, Science, Sensor.

For abstract, see STAR 04 22.

N66-37029 Field 22B
CFSTI Prices HC$3.25 MF$1.25
Michigan Univ., Ann Arbor.
PEACEFUL USES OF EARTH-OBSERVATION SPACECRAFT. VOLUME II - SURVEY OF APPLICATIONS AND BENEFITS.
Sep 66, 177p NASA-CR-587
ContractASW-1084

Descriptors: *Agriculture, *Air pollution, *Geography, *Geology, *Oceanography, *Satellite observation, Air, Animal, Fish, Mapping, Observation, Pollution, Satellite, Sensor, Water.

For abstract, see STAR 04 22.

N66-37030 Field 22B
CFSTI Prices HC$3.75 MF$1.50
Michigan Univ., Ann Arbor.
PEACEFUL USES OF EARTH-OBSERVATION SPACECRAFT. VOLUME III - SENSOR REQUIREMENTS AND EXPERIMENTS.
Sep 66, 249p NASA-CR-588
Contract NASW-1084

Descriptors: *Earth orbit, *Manned space flight, *Spacecraft sensor, Altimeter, Earth, Engineering, Infrared, Manned, Orbit, Photography, Radar, Radiometer, Scanner, Sensing, Sensor, Space flight, Spacecraft, Unmanned.

For abstract, see STAR 04 22.

N66-37117 Field 22B
CFSTI Prices HC$3.00 MF$0.75
General Electric Co., Philadelphia, Pa. Missile And Space Div.
GRAVITY GRADIENT STABILIZATION SYSTEM FOR THE APPLICATIONS TECHNOLOGY SATELLITE EIGHTH QUARTERLY PROGRESS REPORT, 1 APR. - 30 JUN. 1966.
20 Jul 66, 97p NASA-CR-78017
Contract NAS5-9042
Its Doc.- 66sd4388

Descriptors: *Applications technology satellite (ats), *Gravity gradient satellite, *Stability augmentation, Application, Augmentation, Extension, Gradient, Gravity, Pyrotechnics, Retractability, Rod, Satellite, Stabilization, System, Technology, Thrust.

For abstract, see STAR 04 22.

N66-37119 Field 22B
CFSTI Prices HC$2.00 MF$0.50
Rai Research Corp., Long Island City, N. Y.
DEVELOPMENT OF A PROTOTYPE PLASTIC SPACE ERECTABLE SATELLITE QUARTERLY REPORT, JUN. - AUG. 1966.
by L. Cohen, V. F. Dagostino, P. Keusch, and J. Raffo. 15 Sep 66, 46p NASA-CR-78018, RAI-370
Contract NAS5-3923

Descriptors: *Plastic film, *Polyethylene, *Space erectable structure, Copper, Design, Erectable, Evaluation, Film, High density, Plastics, Plating, Polymer, Reinforcement, Satellite, Space, Structure, Thin.

For abstract, see STAR 04 22.

N66-37269 Field 22B
CFSTI Prices HC$2.50 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
SURVEYOR MISSION OPERATIONS SYSTEM.
4 Apr 66, 90p NASA-CR-78009, JPL-TM-33-264
Contract NAS7-100

Descriptors: *Data acquisition, *Launch vehicle, *Spacecraft tracking, *Surveyor project, Acquisition, Command, Data, Mission, Operation, Program, Space, Spacecraft, System, Test, Tracking.

For abstract, see STAR 04 22.

N66-37361 Field 22B
CFSTI Prices HC$7.00 MF$2.00
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile And Space Systems Div.
PHASE II STUDY OF HEAD-END STEERING FOR A SIMPLIFIED MANNED SPACE VEHICLE.
by G. M. Fuller. Mar 66, 372p NASA-CR-66173, SM-51872
Contract NAS1-5451

Descriptors: *Manned space flight, *Steering, *Systems design, Configuration, Cost, Design, End, Head, Manned, Optimization, Performance, Propulsion, Space flight, Spacecraft, System.

For abstract, see STAR 04 22.

N66-37409 Field 22B
CFSTI Prices HC$2.50 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DATA PROCESSING PLAN FOR ORBITING SOLAR OBSERVATORY (OSO-B2).
by J. H. Schmidt, and J. M. Stockwell. Jan 65, 52p NASA-TM-X-55558, X-545-65-35

Descriptors: *Data processing, *Oso, *Quality control, *Scheduling, Control, Data, Ground, Handling, Observatory, Orbit, Processing, Quality, Solar, Station, Suppot.

For abstract, see STAR 04 22.

N66-37411 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERPLANETARY MONITORING PLATFORM IMP III - EXPLORER XXVIII INTERIM FLIGHT REPORT NO. 2.
by F. A. Carr. Jul 66, 32p NASA-TM-X-55561, X-724-66-354

Descriptors: *Explorer xxviii satellite, *Imp, *Power supply, *Telemetry, Data, Handling, Interplanetary, Monitor, Paddle, Platform, Satellite, Solar, Spin, Temperature.

For abstract, see STAR 04 22.

N66-37569 **Field 22B**
CFSTI Prices HC$3.00 MF$0.75
North American Aviation, Inc., Downey, Calif. Space And Information Systems Div.
A STUDY OF ELECTRONIC PACKAGES ENVIRONMENTAL CONTROL SYSTEMS AND VEHICLE THERMAL SYSTEMS INTEGRATION QUARTERLY REPORT NO. 1, MAY - JUL. 1966.
by D. J. Watanabe. 29 Jul 66, 88p NASA-CR-78361, SID-66-1277
Contract NAS8-20320

Descriptors: *Electronic packaging, *Environmental control, *Saturn v launch vehicle, *Space mission, Component, Conditioning, Dissipation, Duration, Integration, Optimization, Rate, System, Thermal.

For abstract, see STAR 04 22.

AD-640 790 **See Field 12B**

AD-640 818 **See Field 17G**

AD-641 027 **See Field 19D**

22C. SPACECRAFT TRAJECTORIES AND REENTRY

AD-466 453 **Field 22C**
CFSTI Prices: HC$3.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
A PEGASUS COMPUTER PROGRAMME FOR THE ASSESSMENT OF THE ACCURACY OF SATELLITE ORBIT DETERMINATION.
Technical rept.,
by R. H. Gooding. Apr 65, 33p TR-65092

Descriptors: (*Orbital trajectories, Programming (Computers)), Satellites (Artificial), Mathematical analysis, Matrix algebra, Radar tracking, Great Britain.

A computer programme is described by means of which one may estimate the potential accuracy of the elements of a given satellite orbit, if determined from observational data of specified type and assumed accuracy. An application of the programme is made to an orbit of six hours period determined from radar observations at a single station. (Author)

AD-640 606 **Field 22C, 17G**
CFSTI Prices: HC$6.00 MF$1.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
ELECTROMAGNETIC DOPPLER SHIFT DATA FOR SATELLITES IN CIRCULAR POLAR ORBITS AT ALTITUDES BETWEEN 250 AND 1000 NAUTICAL MILES.
Technical memo.,
by Gary N. Matuck, and John F. Clark. Aug 66, 274p TG-849
Contract NOw-62-0604

Descriptors: (*Satellites (Artificial), *Doppler effect), (*Satellite attitude, Doppler effect), Programming (Computers), Doppler navigation, Circular orbit trajectories.

A computer program has been used to generate doppler shift of an electromagnetic signal from an orbiting satellite as a function of time. The predicted doppler shift as a function of time is available in two different output formats: a continuous plot of doppler as a function of time before and after closest approach and a tabulated list of doppler as a function of time. The computer program employs a spherical earth and a circular, polar orbit for the satellite. (Author)

AD-640 965 **Field 22C, 17I**
CFSTI Prices: HC$1.00 MF$0.50
Range Instrumentation Systems Office, White Sands, N. Mex.
ORBITAL PARAMETERS. PART I. INCLINATION AND NODAL CROSSING OF THE ORBITAL PLANE FROM RADAR DATA.
Special rept.,
by P. J. Short, and W. L. Shepherd. Jan 66, 22p R1SO-1-66
Proj. DA-1-S-2-50206-D-241

Descriptors: (*Orbital trajectories, Determination), (*Radar tracking, Satellites (Artificial)), Inclined orbit trajectories.

The study utilizes a well-known theorem concerning minima for a certain class of quadratic forms of three variables with a normalizing constraint to determine the angle of inclination and the right ascension of nodal crossing of the orbital plane of a near earth satellite from observation data. (Author)

N66-30315 **Field 22C**
CFSTI Prices HC$3.00 MF$0.75
Massachusetts Inst. Of Tech., Cambridge. Experimental Astronomy Lab.
A SPECIAL-PURPOSE INTERPLANETARY TRAJECTORY COMPUTATION PROGRAM FOR GUIDANCE AND NAVIGATION STUDIES.
by W. T. Mc donald. Jul 65, 77p NASA-CR-76127, RE-19
Grant NSG-254-62

Descriptors: *Computer program, *Interplanetary trajectory, *Navigation and guidance, *Space trajectory program, Arrival, Center, Computer, Cone, Error, Fortran, Guidance, Integration, Interplanetary, Linear, Matrix, Navigation, Program, Search, Simultaneous, Space, State, Study, Subroutine, Time, Trajectory, Transition.

For abstract, see STAR 04 17.

N66-33486 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Experimental Astronomy Lab.
SPECIAL-PURPOSE INTERPLANETARY TRAJECTORY COMPUTATION PROGRAM FOR GUIDANCE AND NAVIGATION STUDIES - USER'S MANUAL.
by W. T. Mc donald. Jul 65, 40p NASA-CR-76160
Grant NSG-254-62

Descriptors: *Computer programming, *Data processing, *Interplanetary navigation, *Trajectory control, Chart, Computation, Control, Data, Flow, Format, Function, Guidance, Interplanetary, Navigation, Processing, Program, Trajectory.

For abstract, see STAR 04 17.

N66-30600 **Field 22C**
CFSTI Prices HC$5.00 MF$1.00
General Dynamics/convair, San Diego, Calif.
POSTFLIGHT TRAJECTORY REASSEMBLY AC-6.
by B. R. Hurlbut, and L. G. Wilson. 18 Feb 66, 172p NASA-CR-76201, GD/C-BTD-66-012
Contract NAS3-3232

Descriptors: *Atlas centaur launch vehicle, *Computer simulation, *Trajectory analysis, Analysis, Capability, Comparison, Computer, Data, Flight, Launch vehicle, Performance, Postflight, Prediction, Preflight, Program, Simulation, Trajectory.

For abstract, see STAR 04 17.

N66-31868 **Field 22C, 17H**
CFSTI Prices HC$2.00 MF$0.50
Radio And Space Research Station, Slough (England).
KINETHEODOLITE OBSERVATIONS OF SATELLITES RECEIVED BY THE SATELLITE ORBITS GROUP FROM MALTA FOR NOVEMBER AND DECEMBER 1965.
1966, 32p
Its Issue No. 10

Descriptors: *Satellite observation, *Theodolite, Azimuth, Elevation, Malta, Measurement, Observation, Orbit, Satellite, Time.

For abstract, see STAR 04 17.

N66-32116 **Field 22C**
CFSTI Prices HC$3.00 MF$0.75
Sperry Gyroscope Co., Great Neck, N. Y.
PROGRAMMERS MANUAL FOR GODDARD ORBIT DETERMINATION PROGRAM.
Apr 65, 343p NASA-CR-64931, AB-1210-0038-3
Contract NAS5-3509

Descriptors: *Fortran, *Manual, *Orbit calculation, Bayesian statistics, Calculation, Coding, Computer, Definition, Diagram, Flow, Format, Generation, Manipulation, Matrix, Orbit, Program, Programmer, Subroutine, Tape, Trajectory, Variance.

For abstract, see STAR 04 17.

N66-32121 **Field 22C**
CFSTI Prices HC$3.25 MF$1.25
Stanford Univ., Calif. Dept. Of Aeronautics And Astronautics.
CONTROL OF THE RELATIVE MOTION BETWEEN SATELLITES IN NEIGHBORING ELLIPTIC ORBITS.
by W. R. Davis. May 66, 190p NASA-CR-76585, SUDAAR-274
Grant NSG-582

Descriptors: *Elliptical orbit, *Motion stability, *Satellite drag, *Translational motion, Axis, Computer, Control, Differential, Digital, Drag, Ellipticity, Equation, Error, Euler equation, Linear, Matrix, Motion, Orbit, Program, Satellite, Simulation, Stability, Thrust, Transition, Translation, Tumbling, University.

For abstract, see STAR 04 17.

N66-32328 **Field 22C**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A COMPUTATIONAL METHOD FOR TWO-IMPULSE ORBITAL RENDEZVOUS AND TRANSFER PROBLEMS.
by R. L. Collins, and S. A. Wallace. Aug 66, 86p NASA-TN-D-3508

Descriptors: *Computer program, *Elliptical orbit, *Orbital transfer, *Rendezvous, Celestial, Computation, Dimensional, Ellipticity, Mechanics, Method, Orbit, Orbital, Problem, Three, Transfer.

For abstract, see STAR 04 17.

N66-32440 **Field 22C**
CFSTI Prices HC$2.50 MF$0.50
Iit Research Inst., Chicago, Ill. Astro Science Center.

A SURVEY OF MULTIPLE MISSIONS USING GRAVITY-ASSISTED TRAJECTORIES.
by J. C. Niehoff. Apr 66, 59p NASA-CR-76767, M-12
Contract NASR-65/06/

Descriptors: *Gravitational effect, *Gravity, *Interplanetary flight, *Launch date, *Solar system, Asteroid, Date, Earth, Effect, Flight, Interplanetary, Jupiter (planet), Launch, Mars, Mercury, Mission, Multiple, Neptune, Probe, Saturn, Solar, System, Target, Uranus, Venus.

For abstract, see STAR 04 17.

N66-36851 **Field 22C**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
EVALUATION OF A NEW METHOD OF INTEGRATING THE ORBITAL EQUATIONS OF MOTION FOR USE IN SPACE NAVIGATION.
by J. D. Mc lean. Sep 66, 59p NASA-TN-D-3624
Contract 125-17-05-01-21

Descriptors: *Computer program, *Motion equation, *Space navigation, Computer, Digital, Earth, Equation, Evaluation, Integration, Method, Moon, Motion, Navigation, Orbital, Program, Space, Sun, Trajectory.

For abstract, see STAR 04 22.

N66-37115 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
TRANSONIC DYNAMIC STABILITY CHARACTERISTICS OF SEVERAL MODELS OF PROJECT MERCURY CAPSULE CONFIGURATIONS.
by E. R. Hillje, and W. B. Igoe. Aug 61, 38p NASA-TM-X-554

Descriptors: *Aerodynamic stability, *Mercury capsule, *Transonic speed, Capsule, Characteristics, Configuration, Dynamics, Model, Oscillation, Pitch, Reentry, Scale, Stability, Test, Transonic, Tunnel, Wind, Yaw.

For abstract, see STAR 04 22.

N66-37141 **Field 22C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
INTERCEPT MISSIONS TO ASTEROID EROS IN 1974 AND COMET D'ARREST IN 1976.
by T. J. Kreiter. Oct 66, 21p NASA-TM-X-1288
Contract 180-06-06-02-22

Descriptors: *Comet, *Eros asteroid, *Rendezvous trajectory, Analysis, Conical, Dimensional, Interception, Launch, Mission, Patch, Rendezvous, Three, Trajectory, Window.

For abstract, see STAR 04 22.

N66-37220 **Field 22C**
CFSTI Prices HC$1.00 MF$0.50
General Precision, Inc., Little Falls, N. J. Mathematics Dept.
STUDY OF REDUCED PROBLEMS OF THREE AND FOUR BODIES IN CONNECTION WITH CISLUNAR TRAJECTORIES FINAL REPORT, APR. 1965 - APR. 1966.
Apr 66, 14p NASA-CR-78252
Contract NAS5-9169

Descriptors: *Hamiltonian, *Motion equation, *Three-body problem, *Trajectory, Body, Cislunar, Coefficient, Ellipticity, Equation, Four, Linear, Motion, Nonlinear, Periodic, Polynomial, Problem, Reduction, Solution, System, Three.

For abstract, see STAR 04 22.

N66-37266 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
PRELIMINARY ANALYTICAL INVESTIGATION OF BOOSTER RECOVERY BY USE OF A HOT-AIR BALLOON FOR BOTH DECELERATION AND FINAL RECOVERY.
by J. C. Dunavant, S. H. Scher, and I. G. Young. Oct 66, 43p NASA-TN-D-3661
Contract 124-07-03-06-23

Descriptors: *Aerodynamic heating, *Balloon, *Booster recovery, *Flight mechanics, *Recovery device, *Weight analysis, Aerodynamic, Analysis, Booster, Device, Flight, Heating, Hot air, Mechanics, Recovery, System, Weight.

For abstract, see STAR 04 22.

N66-37573 **Field 22C**
CFSTI Prices HC$3.00 MF$0.50
Stanford Univ., Calif. Dept. Of Aeronautics And Astrnautics.
RIGOROUS ERROR BOUNDS ON POSITION AND VELOCITY IN SATELLITE ORBIT THEORIES.
by J. V. Breakwell, and J. Vagners. Jun 66, 56p NASA-CR-78387, SUDAAR-279
Grant NSG-133-61

Descriptors: *Orbit calculation, *Satellite orbit, *Velocity error, Eccentricity, Error, Hamiltonian, Harmonics, Position, Tesseral, Theory.

For abstrt, see STAR 04 22.

N66-37579 **Field 22C**
CFSTI Prices HC$3.00 MF$0.75
United Aircraft Corp., East Hartford, Conn. Research Labs.
STUDY OF LOW-ACCELERATION SPACE TRANSPORTATION SYSTEMS SUMMARY REPORT, JUL. 1964 - JUN. 1965.
by R. V. Ragsac. Jun 66, 78p NASA-CR-78312, E-910262-6, VOL. I
Contract NAS8-11309

Descriptors: *Hybrid propulsion, *Mars spacecraft, *Mission planning, *Trajectory analysis, Combination, Design, Electric, Feasibility, High thrust, Low thrust, Manned, Mars (planet), Mission, Nuclear, Power, Propulsion, Requirement, System.

For abstract, see STAR 04 22.

22D. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

N66-30537 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MOTION STUDY OF THE SUCTION DUCTING ON THE S-IC STAGE OF THE SATURN V VEHICLE.
by H. E. Fursdon. 22 Jun 66, 37p NASA-TM-X-53471

Descriptors: *Angular motion, *Bellows, *Feed system, *Saturn s- ic stage, Angle, Angular, Axial, Duct, Engine, Feed, Gimbal, Joint, Liquid, Method, Motion, Oxygen, Saturn, Suction, System, Vehicle.

For abstract, see STAR 04 17.

N66-31222 **Field 22D**
CFSTI Prices HC$6.00 MF$1.50
General Electric Co., Philadelphia, Pa. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Missile And Space Div.
VOYAGER SPACECRAFT SYSTEM STUDY (PHASE II SATURN V LAUNCH VEHICLE), VOLUME I IB FINAL REPORT.
9 Dec 64, 294p NASA-CR-76370
Contracts NAS7-100, JPL-950847
Prepared For Jpl Its Doc.-64sd4376

Descriptors: *Saturn v launch vehicle, *Spacecraft design, *Systems analysis, *Voyager project, Alternative, Analysis, Cost, Design, Estimate, Facility, Program, Requirement, Schedule, Spacecraft, System, Test.

For abstract, see STAR 04 17.

N66-31350 **Field 22D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ORIGIN OF HIGH-INTENSITY NOISE IN THE AREA OF A LARGE PROTUBERANCE ON A LAUNCH VEHICLE.
by M. L. Nacht, and R. A. Turk. Jul 66, 16p NASA-TM-X-1261

Descriptors: *Atlas agena launch vehicle, *Noise intensity, *Protuberance, *Scale model, *Supersonic wind tunnel, Angle of attack, Boundary, Equipment, Fluctuation, High intensity, Interaction, Launch vehicle, Layer, Level, Mariner c spacecraft, Model, Noise, Origin, Pod, Power, Pressure, Scale, Shock, Spectrum, Supersonic, Tunnel, Vibration, Wind.

For abstract, see STAR 04 17.

N66-31360 **Field 22D**
CFSTI Prices HC$6.00 MF$1.25
Boeing Co., Huntsville, Ala. Launch Systems Branch.
RESEARCH ON PASSIVE INSTRUMENTATION AND STIMULI GENERATION FOR SATURN IB EQUIPMENT CHECKOUT. VOLUME III - APPENDIX A, LABORATORY DATA FINAL TECHNICAL REPORT, 26 JUN. 1965 - 31 MAY 1966.
by H. N. Kaushagen, and K. L. Skinner. 31 May 66, 223p NASA-CR-76408, D5-13268-3
Contract NAS8-20090

Descriptors: *Checkout equipment, *Nondestructive testing, *Saturn ib launch vehicle, Beam, Checkout, Data, Device, Electro-optics, Electronic, Equipment, Evaluation, Fiber, Flow, Generation, Hall effect, Instrumentation, Laboratory, Magnetoresistance, Meter, Nondestructive, Optics, Passive, Resonant, Stimulus, Testing, Ultrasonic.

For abstract, see STAR 04 17.

N66-31362 **Field 22D**
CFSTI Prices HC$7.00 MF$1.75
Boeing Co., Huntsville, Ala. Launch Systems Branch.
RESEARCH ON PASSIVE INSTRUMENTATION AND STIMULI GENERATION FOR SATURN IB EQUIPMENT CHECKOUT. VOLUME IV - APPENDIX B, INSTRUMENT UNIT DATA SHEETS FINAL TECHNICAL REPORT, 26 JUN. 1965 - 31 MAY 1966.
by H. N. Kaushagen, and K. L. Skinner. 31 May 66, 355p NASA-CR-76407, D5-13268-4
Contract NAS8-20090

Descriptors: *Checkout equipment, *Nondestructive testing, *Saturn ib launch vehicle, Checkout, Connector, Data, Equipment, Generation, Instrument, Instrumentation, Nondestructive, Passive, Sheet, Stimulus, Testing, Umbilical, Unit.

For abstract, see STAR 04 17.

N66-31485 **Field 22D**
CFSTI Prices HC$7.00 MF$1.75
Boeing Co., Huntsville, Ala. Launch Systems Branch
RESEARCH ON PASSIVE INSTRUMENTATION AND STIMULI GENERATION FOR SATURN IB EQUIPMENT CHECKOUT. VOLUME II - DETAILED TECHNICAL REPORT FINAL REPORT, 26 JUN. 1965 - 31 MAY 1966.
by H. N. Kaushagen, and K. L. Skinner. 31 May 66, 311p NASA-CR-7640, D5-13268-2
Contract NAS8-20090

Descriptors: *Checkout equipment, *Nondestructive testing, *Saturn ib launch vehicle, Checkout, Chemical, Coupling, Electric, Equipment, Flow, Generation, Hall effect, Heat, Infrared, Instrumentation, Magnetic, Measurement, Meter, Nondestructive, Nuclear, Optical, Passive, Photon, Resonance, Response, Stimulus, Testing, Ultrasonic, X-ray.

For abstract, see STAR 04 17.

N66-31857 **Field 22D**
CFSTI Prices HC$3.00 MF$0.75
Honeywell, Inc., St. Paul, Minn.
MINIMAX CONTROL OF LARGE LAUNCH BOOSTERS.
by K. D. Graham. Jul 66, 77p NASA-CR-546
Contract NAS8-11206

Descriptors: *Launch vehicle, *Optimal control, Approximation, Booster, Constant, Control, Controller, Cost, Drift, Estimate, Method, Optimal, Specific, Theory.

For abstract, see STAR 04 17.

N66-32140 **Field 22D**
CFSTI Prices HC$3.00 MF$0.75
Lockheed Missiles And Space Co., Sunnyvale, Calif.
THE AEROELASTIC CHARACTERISTICS OF THE SATURN IB SA-203 LAUNCH VEHICLE.
by L. E. Ericsson, and N. J. French. Apr 66, 120p NASA-CR-76563, M-37-66-2
Contract NAS8-11238

Descriptors: *Aeroelasticity, *Saturn launch vehicle, *Shock wave interaction, Acceleration, Aerodynamic, Bending, Boundary, Computation, Cone, Damping, Field, Flow, Instability, Interaction, Launch vehicle, Layer, Payload, Shock, Static, Terminal, Trajectory, Wave.

For abstract, see STAR 04 17.

N66-32144 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
Trw Systems, Redondo Beach, Calif.
THE PIONEER SPACECRAFT.
by A. B. Mickelwait. 1966, 32p NASA-CR-76541
Contract NAS2-1700
Presented At The Symp. On Exploration Of The Moon And Interplanetary Space, Munich, 22 Apr. 1966

Descriptors: *Interplanetary flight, *Pioneer space probe, *Solar probe, *Spacecraft configuration, Application, Communication, Configuration, Design, Energy, Experiment, Exploration, Flight, History, Instrumentation, Interplanetary, Maneuver, Orbit, Orientation, Power, Probe, Solar, Space, Spacecraft, System, Trajectory.

For abstract, see STAR 04 17.

N66-37519 **Field 22D**
CFSTI Prices HC$3.00 MF$0.50
Boeing Co., Huntsville, Ala. Space Div.
IMPLEMENTATIONS GUIDELINES, AIRBORNE EVALUATION EQUIPMENT, ADVANCED SYSTEM CHECKOUT DESIGN, PHASE B FINAL REPORT, 29 JUN. 1965 - 29 JUL. 1966.
by H. N. Kaushagen, and K. L. Skinner. 29 Jul 66, 52p NASA-CR-78336, D5-13288
Contract NAS8-20240

Descriptors: *Airborne equipment, *Checkout equipment, *Saturn s- ivb stage, Equipment, Evaluation, Ground, Instrumentation, Method, Onboard, Saturn v launch vehicle, Spacecraft, Support, Testing.

For abstract, see STAR 04 2.

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Field 22D

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CURRENT r & d PROJECTS

01 AERONAUTICS

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ZQN 530479 4 FIELD 13J, 8H,12A,22C

WAVE HINDCAST PROJECT-DECK MOTION STUDIES

D. C. LINDQUIST

/65- /

DOD-NAVY

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GQF 258045 1 FIELD 1C

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

REDUCTION AND ANALYSIS OF FLIGHT TEST DATA RELATING ELECTRIC FIELD MEASUREMENTS TO CLEAR AIR TURBULANCE

J. E. NANEVICZ

AF-19-628-03308
/65- /

DOD-AIR FORCE

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GQN 530487 FIELD 1C, 1B,20L,10B

MASS INST OF TECHNOL, GRADUATE SCHOOL, MASSACHUSETTS

ROTOR BLADE AIRLOAD STUDIES

. NONE

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DOD-NAVY

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GQN 530492 FIELD 1C,13J

HYDRO-SKI TEST VEHICLE REPAIR

. NONE

N600-19-59309
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DOD-NAVY

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IQF 260048 FIELD 1C, 4A,12A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ROBIN DEVELOPMENT PROGRAM

A. B. WRIGHT

/65- /

DOD-AIR FORCE

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ZQN 530532 3 FIELD 1C, 1B,12A,22C

USN, WEAPON LAB DAHLGN, VIRGINIA

AIRCRAFT LANDING AND FLYING HOUR USAGE COMPUTER PROGRAM

D. C. LINQUIST

/65- /

DOD-NAVY

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ZQN 530598 FIELD 1C, 1B,20D,10B

NAVAL AIR DEVELOPMEN, PENNSYLVANIA

HELICOPTER ROTOR BLADE FLIGHT LOAD SIMULATION TESTS

A. P. COWLES

/65- /

DOD-NAVY

02 AGRICULTURE

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GYE 290163 FIELD 13B, 8D, 8F, 8G

RUTGERS THE STATE UNIV, AGRICULTURAL EXPT STA, SOIL + CROP SCIENCE, NEW JERSEY

ORIGIN, DEVELOPMENT, CHARACTERISTICS AND CLASSIFICATION OF NEW JERSEY SOILS

J. C. TEDROW

AG-NJ-0030
7/65- 6/66

AGRICULTURE-DEPT OF AGRICULTURE

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ZT 80 4 FIELD 13G, 8H, 9C, 9+

TENN VALLEY AUTHORITY, TENNESSEE

WATER DISPATCHING OPERATIONS BY IBM 704 COMPUTER

. NONE

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TENNESSEE VALLEY AUTHORITY

03 ASTRONOMY AND ASTROPHYSICS

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GQF 924 7 FIELD 3A, 3B,12A, 7B

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, ASTRONOMY, CALIFORNIA

COMPUTATIONAL RESEARCH IN ASTROPHYSICS

L. G. HENYEY

AF-AFOSR-0171-65
/65- /

DOD-AIR FORCE

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GQF 3372 2 FIELD 3A, 3B,12A, 7B

UNIV OF CAL-L. A., GRADUATE SCHOOL, ASTRONOMY, CALIFORNIA

CHEMICAL COMPOSITIONS OF GASEOUS NEBULAE AND HYDROGEN-DEFICIENT STARS

L. H. ALLER

AF-AFOSR-0083-65
/65- /

DOD-AIR FORCE

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GQF 4334 FIELD 3A, 4A, 5A,20I

PRINCETON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW JERSEY

RESEARCH IN THE ASTROPHYSICAL SCIENCES

L. SPITZER, M. B. GOTTLIEB

AF-49-638-01555
/65- /

DOD-AIR FORCE

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GQF 258023 1 FIELD 3A, 3B, 4A

WENTWORTH INST., BOS, MASSACHUSETTS

ANALYSIS OF RADIO ASTRONOMY DATA TAKEN AT SAGAMORE HILL

M. J. DAVIN

AF-19-628-03282
/65- /

DOD-AIR FORCE

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GQF 258025 1 FIELD 3A, 3B, 9+, 9A

OHIO STATE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, OHIO

EXPERIMENTAL STUDY TO DETERMINE SPECTRA + LOCATION OF RADIO SOURCE STARS AT 200 TO 2KMC/S

J. D. KRAUS

AF-19-628-03310
/65- /

DOD-AIR FORCE

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GQF 258235 1 FIELD 3A, 3B

UNIVERSITY OF OSLO, NORWAY

OBSERVATION + ANALYSIS OF SOLAR NOISE

STORMS STUDY SUNSPOTS + OPTICAL-RADIO PHENOMENA

E. JENSEN

AF-61-052-00743
/65- /

DOD-AIR FORCE

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GQF 258758 2 FIELD 3A,20D

FLUID MODELING AND MATHEMATICAL SUPPORT FOR LABORATORY ASTROPHYSICS PROGRAM

K. L. ROGERS

AF-19-628-02837
/65- /

DOD-AIR FORCE

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GQF 259405 3 FIELD 3A, 3B, 4A,20J

UNIVERSITY OF LIEGE, BELGIUM

RELATE SOLAR ACTIVITY COMETRY SPECTRA AND TERRESTRIAL PHENOMENA

P. SWINGS

AF-61-052-00587
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GSP 2460 FIELD 3A, 5A

US, SMITHSONIAN INST, DIST OF COLUMBIA

STELLAR ATMOSPHERES

C. A. WHITNEY

NSF-GP-4318
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2548 FIELD 3A, 4A

NATL CTR ATMOSPH RES, BOULDER, COLORADO

ROTATIONALLY FORCED EJECTION OF MATTER FROM STARS

B. STILLER, W. O. ROBERTS

NSF-GP-4668
9/64- 9/65

NSF-PHYSICAL SCIENCES DIVISION

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GSS 702 FIELD 3A

THE MEDIEVAL HEBREW TRADITION IN ASTRONOMY

B. R. GOLDSTEIN

NSF-GS-821
6/65- 6/66

NSF-SOCIAL SCIENCES DIVISION

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GSS 876 FIELD 3A

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, HISTORY OF SCIENCE, MARYLAND

A HISTORY OF ASTROPHYSICS

H. WOOLF

NSF-GS-776
9/65- 9/66

NSF-SOCIAL SCIENCES DIVISION

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GQF 258616 1 FIELD 3B, 4A,20F

UNIV OF HULL, UNITED KINGDOM

DESIGN + MODIFY GROUND-BASED AND BALLOON-BORNE SPECTROMETRIC TECHNIQUES FOR LUNAR RESEARCH

J. RING

AF-61-052-00751
/65- /

DOD-AIR FORCE

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GQF 3228 2 FIELD 3C,12A

INST FOR ADV STUDIES, NEW JERSEY

ANALYSIS IN THE LARGE

M. MORSE

AF-AFOSR-0357-63
/65- /

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GQF 3951 FIELD 3C, 3A, 4A, 5A

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, MATHEMATICS, TEXAS

INTERNATIONAL SYMPOSIUM ON HIGH ENERGY ASTRONOMY

E. L. SCHUCKING, E. M. SCHUCKING

AF-AFOSR-0725-65
/65- /

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GQF 4409 FIELD 3C, 3A,20J

AMER MATH SOC, RHODE ISLAND

RELATIVITY THEORY AND ASTROPHYSICS

G. L. WALKER

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04 ATMOSPHERIC SCIENCES

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GQF 258071 1

ARACON GEOPHYSICS CO, CONCORD, MASSACHUSETTS

STUDY OF THREE DIMENSIONAL SMALL SCALE AIR MOTIONS IN STORM CONDITIONS

A. GLASER

AF-19-628-03893
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DOD-AIR FORCE

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GQF 258166 1 FIELD 8+, 9+, 9A

TECHNICAL OPERATIONS, MASSACHUSETTS

DEVELOPMENT OF LASER FOG DISDROMETER FOR SPHERICAL AND NON-SPHERICAL DROPSIZE MEASUREMENTS

G. B. PARRENT

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YCO 119

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, ATMOSPHERIC SCIENCE, COLORADO

EVALUATION OF WEATHER MODIFICATION OPERATIONS

L. GRANT

7/65- 6/66

STATE-COLORADO

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ZPE 1006 FIELD 20D, 5A

METEOROLOGICAL MODEL STUDIES-MODELING ATMOSPHERIC DIFFUSION IN A WIND TUNNEL

G. H. STROM, H. MOSES, G. M. STROM

/66- /

AEC-BIOLOGY + MEDICINE

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ZQF 260044 FIELD 1C, 3A, 3B

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ADVANCE ATMOSPHERIC RECONNAISSANCE TECHNIQUES

R. W. COWNE

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ZQF 260169 FIELD 18,22D

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INVESTIGATION OF THUNDERSTORM ELECTRICITY

D. R. FITZGERALD

/65- /

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ZQF 260174 FIELD 1C, 18

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

NEW CLIMATOLOGICAL TECHNIQUES

I. I. GRINGORTEN

/65- /

DOD-AIR FORCE

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GQF 32 8 FIELD 4A, 8+, 9+

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

WAVE PARTICLE INTERACTIONS IN THE MAGNETOSPHERE

R. A. HELLIWELL

AF-AFOSR-0783-65
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GQF 1210 4 FIELD 3A, 4A, 5A,20H

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MISSOURI

PRIMARY COSMIC RAY COMPOSITION AND TIME VARIATION

R. W. FRIEDLANDER

AF-AFOSR-0382-64
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DOD-AIR FORCE

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GQF 1331 4 FIELD 3A, 4A, 5A, 7B

MASS INST OF TECHNOL, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

BOLIVIAN AIR SHOWER JOINT EXPERIMENT

G. W. CLARK

AF-AFOSR-0546-65
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DOD-AIR FORCE

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GQF 258014 1 FIELD 4A, 9+, 9A

MAINTAIN AND OPERATE IONOSPHERIC SOUNDER SITE AT MAYNARD MASS

D. DAVIDSON

AF-19-628-03267
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GQF 258024 2 FIELD 4A

KIRUNA GEOPHYS OBSERV, SWEDEN

EXPERIMENTAL STUDY OF AURORAL IONO SPHERE AT VHF + ELF USING RADIOASTRONOMY TECHNIQUES

B. HULTQVIST

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DOD-AIR FORCE

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GQF 258026 1 FIELD 4A

UNIV OF ATHENS, GREECE

RESEARCH ON THE IONOSPHERE USING TRANSMISSIONS FROM ACTIVE SATELLITES

. ANASTASSIADES

AF-61-052-00754
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GQF 258028 1 FIELD 3A, 4A

UNIVERSITY OF GHANA, GHANA

EXPERIMENTAL STUDIES OF IONOSPHERIC CHARACTERISTICS BY OBSERVATION OF SATELLITE + RADIO + STAR EMISSI

J. R. KOSTER

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GQF 258029 1 FIELD 4A

UNIV OF PARIS, FRANCE

EXPERIMENTAL STUDY OF THE IONOSPHERE USING SATELLITE TRANSMISSIONS FARADAY ROTATION MEASURES

E. VASSY

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GQF 258058 FIELD 4A

FABRICATION + TEST OF SELECTED PORTIONS OF PROTOTYPE ADVANCED UPPER AIR SOUNDING SYSTEM

J. KIRCH

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GQF 258279 2 FIELD 4A

OPTICAL STUDIES OF AIRGLOW + TWILIGHT SKY ASSOCIATED WITH THE AURORA

A. V. JONES

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GQF 258289 2 FIELD 4A

IONOSPHERIC INST BRIES, GERMANY

CONDUCT THEORETICAL + EXPERIMENTAL STUDIES OF IONOSPHERIC WINDS DRIFT DIRECTION + VELOCITY

K. RAWER

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GQF 258301 1 FIELD 22C, 3A, 4A

MICROSCOPIC STUDIES OF EXT

C. L. HEMENWAY

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GQF 258363 1 FIELD 4A

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

DEVELOP TECHNIQUES FOR MEASUREMENT OF IONOSPHERIC WINDS AND AIR DENSITIES BY METEOR TRAIL OBSERVATION

A. M. PETERSON

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/65- /

DOD-AIR FORCE

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GQF 258475 2 FIELD 4A, 8+, 9+, 5A

BOSTON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

STUDY OF EM PROPERTIES OF THE ATMOSPHERE USING RADIO ASTRONOMY TECHNIQUES

G. HAWKINS

AF-19-628-02350
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GQF 258502 3 FIELD 4A

EXPERIMENTAL DET OF IONOSPHERIC CHARACTERISTICS USING SATELLITE RADIO TRANSMISSION

D. J. LINEHAN

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/65- /

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GQF 258503 2 FIELD 4A

ANALYTICAL STUDIES OF IONOSPHERIC IRREGULARITIES USING DATA FROM SEVERAL SOURCES

M. G. MORGAN

AF-19-628-02493
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GQF 258564 2 FIELD 3A, 4A, 5A

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, PHYSICS, ILLINOIS

RESEARCH ON COSMIC RADIATION INCLUDING OPERATION OF NEUTRON MONITORING NETWORK

J. A. SIMPSON

AF-19-628-02473
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GQF 258625 2 FIELD 4A, 7B

UNIVERSITY OF LIEGE, BELGIUM

HIGH RESOLUTION ATMOSPHERIC IR ABSORPTION AND SKY BACKGROUND EMISSION INTERFEROMETRIC STUDIES

M. V. MIGEOTTE

AF-61-052-00685
/65- /

DOD-AIR FORCE

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GQF 259051 FIELD 4A, 9C, 9+, 9A

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

RESEARCH STUDY OF RADIATION + RECEPTION OF EM ENERGY FROM AIRCRAFT + GUIDED MISSILES

T. MORITA

AF-19-628-04800
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DOD-AIR FORCE

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GQF 259221 FIELD 4A,12A, 8E,20H

WICHITA STATE UNIV, GRADUATE SCHOOL, PHYSICS, KANSAS

SIMULTANEOUS MEASUREMENTS OF GEOMAGNETIC FLUCTUATIONS AND LUMINESCENCE FROM BRIGHT METEOR TRAILS

A. W. JENKINS

AF-19-628-04768
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DOD-AIR FORCE

GQF 259447 FIELD 7A, 4A,20J

WARNER + SWASEY CO.,, NEW YORK

STUDY OF TEMPERATURE DEPENDENCE OF SPECTRAL LINE WIDTHS AND INTENSITIES IN ATMOSPHERIC GASES

H. BARROV

AF-19-628-04989
/65- /

DOD-AIR FORCE

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GQF 259524 FIELD 3A, 3B, 4A

TECH FOR + STUDY ATTENUATION OF SOLAR BEAM IN ATMOS IN 029-3.5 M REG + RADIATIVE TRANS IN 3.5-35 M REG

. NONE

AF-19-628-05210
/65- /

DOD-AIR FORCE

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GQF 259674 FIELD 7C,21B,21I, 4A

DEVELOPMENT + FABRICATION OF A COMBUSTIBLE ROCKET PAYLOAD FOR CHEMILUCENT EXPERIMENTS

. NONE

AF-19-628-05046
/65- /

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GQF 259750 2 FIELD 4A,20D,10B

STUDIES TO DEVELOP A PHYSICAL MODEL OF ROCKET EXHAUST STRUCTURE AND INTERACTION WITH UPPER ATMOSPHERE

. NONE

AF-19-628-02369
/65- /

DOD-AIR FORCE

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GQF 259780 1 FIELD 4A

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

STUDY RF SCATTERING FROM IONIZED UPPER ATMOS PERTURBATION ASSOCIATED WITH MISSILE PASSAGE

. NONE

AF-19-628-03296
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DOD-AIR FORCE

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GQQ 595252 FIELD 4A,12A,20J, 5A

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

MICROMETEORITE BACK SCATTERING

U. VANWIJK, C. O. ALLEY, S. K. POULTNEY

SD-101
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GSP 2458 FIELD 4A, 5A

UNIVERSITY NEW MEXICO, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, NEW MEXICO

BALLOON INVESTIGATION OF SOLAR NEUTRONS

C. P. LEAVITT

NSF-GP-4686
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2459 FIELD 4A,20J, 5A

UNIV OF PITTSBURGH, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

RESONANCE RADIATION EXCITATION IN THE AIRGLOW

T. M. DONAHUE

NSF-GP-4435
6/65- 6/66

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ZPE 1033 FIELD 7D, 7A, 4A,18A

US, AEC, OPER OFFICE, NEW YORK

UPPER AIR STUDIES

G. A. WELFORD, J. S. ALERCIO, N. Y. CHU L. P. SALTER, D. STURNIOLO

/66- /

AEC-BIOLOGY + MEDICINE

•••••••••

ZQF 260059 FIELD 3A, 4A,20L

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

CHARGED PARTICLE ANALYSIS

H. E. HINTEREGGER

/65- /

DOD-AIR FORCE

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ZQF 260064 FIELD 4A, 8+, 9+, 9A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

SATELLITE DENSITY MEASUREMENTS

C. G. STERGIS

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ZUA 856 FIELD 4A

REFRACTION CORRECTIONS FROM METEOROLOGICAL DATA

J. B. ROWLAND

INT-GS-30-05
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INTERIOR-GEOLOGICAL SURVEY

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ZUF 270 FIELD 8H, 4A

USDI, BUR RECLAM, DENVER, COLORADO

RADIO METHODS FOR DETERMINING WATER VAPOR CONTENT OF AIR

Q. L. FLOREY, B. R. BEAN, R. E. MCGAVIN H. D. NEWKIRK

/66- /

INTERIOR-BUREAU OF RECLAMATION

06 BIOLOGICAL AND MEDICAL SCIENCES

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1GM 13191 2 FIELD 7C, 7D,20J, 5I

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

ESR EXPERIMENTS ON MODEL PHOTOSYNTHETIC SYSTEMS

G. FEHER, D. C. MAUZERALL

4/66- 3/67

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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GSB 4513 FIELD 7C, 7D, 7A,20J

ILLINOIS INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

CONFORMATION AND ASSOCIATION IN PEPTIDES

K. D. KOPPLE

NSF-GB-4514
12/65-12/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

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PCS 391 FIELD 7C

STANFORD UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

CRYSTALLOGRAPHIC STUDIES OF BIOLOGICAL MOLECULES

P. G. SIMPSON

407-G
9/65- 8/66

PETROLEUM RESEARCH FUND-AMER CHEM SOC

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ZPE 873 FIELD 7C, 7D,20L, 7B

US, AEC, LOS ALAMOS, NEW MEXICO

CHEMICAL SYNTHESIS OF ISOTOPICALLY DOUBLE-LABELED DIDEOXYRIBONUCLEOTIDES

D. L. WILLIAMS

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AEC-BIOLOGY + MEDICINE

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1GM 13912 1 FIELD 6B, 9+

COLUMBIA UNIVERSITY, SCHOOL OF MEDICINE, ANESTHESIOLOGY, NEW YORK

APPLICATION OF ENGINEERING TO PROBLEMS IN MEDICINE

A. S. LEE, R. M. EPSTEIN, S. GRAFF D. V. HABIF, J. R. MALM, G. G. NAHAS H. RACKOW

2/66- 1/67

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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PCS 488 FIELD 20J

THEORETICAL MOLECULAR STRUCTURE INVESTIGATIONS

J. L. WHITTEN

687-G2
9/65- 8/66

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PRW 6 1 FIELD 20J,20C, 5A,20F

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, PHYSICS, TEXAS

X-RAY ABSORPTION EDGE STUDIES OF CHEMICAL BONDING

H. P. HANSON

F-016
56/5 -46/6

WELCH, ROBERT A FOUNDATION-TEXAS

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PRW 54 1 FIELD 20J

RICE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

PROBLEMS IN CHEMICAL BONDING

K. S. PITZER

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5/65- 4/66

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NG 31 FIELD 12A,20J

PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

ANALYSIS OF CONTRIBUTIONS TO CHEMICAL BOND ENERGIES

J. W. RICHARDSON, A. K. PACK

I
7/64- 6/65

PURDUE UNIVERSITY

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GQF 3514 2 FIELD 7A, 7D,20M,20J

MIDWEST RES INST KAN, MISSOURI

DETERMINATION OF MIXED VIRIAL COEFFICIENTS

J. BREWER

AF-49-638-01190
/65- /

DOD-AIR FORCE

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GQF 4417 FIELD 19D, 7A,20J

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

ULTRAPID-SCAN SPECTROSCOPIC OF REACTIVE MOLECULES

G. C. PIMENTEL

AF-AFOSR-0852-65
/65- /

DOD-AIR FORCE

PCS 485 FIELD 7A, 7D

THE EFFECT OF ADSORPTION ON ELECTRODE KINETICS

R. DELEVIE

678-G2
9/65- 8/66

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PRW 17 1 FIELD 7A,20J

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

NUCLEAR MAGNETIC RESONANCE INVESTIGATION OF PARAMAGNETIC SOLUTIONS

L. O. MORGAN

F-041
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

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NG 21 FIELD 20M,20J, 5A, 7B

PURDUE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, INDIANA

FINE STRUCTURE OF THE HE II 4686 A LINE IN AN ATOMIC BEAM SOURCE

R. W. STANLEY, H. P. LARSON

6/64- 5/65

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PCS 455 FIELD 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

THE REACTION OF ALKALI METAL HYDROBORATES WITH ELEMENTAL SULFER

B. F. SPIELVOGEL

584-G2
9/65- 8/66

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PCS 459 FIELD 20J, 7B

BOSTON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

BLENDING OF INDUCTIVE AND RESONANCE EFFECTS IN CARBON ACIDITY

J. P. LORAND

592-G1
9/65- 8/66

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1AM 10399 1 FIELD 7C, 7D

UNIV OF WISCONSIN, SCHOOL OF PHARMACY, PHARMACEUTICAL CHEM, WISCONSIN

SYNTHESIS OF 11-FUNCTIONALIZED STEROIDS

P. A. HART

1/66-12/66

PHS-NIH-NATL INST ARTHRITIS + METAB DIS

1GM 8797 5 FIELD 7C, 7D

UNIV OF CINCINNATI, GRADUATE SCHOOL, CHEMISTRY, OHIO

A NEW REARRANGEMENT YIELDING HETEROCYCLIC SYSTEMS

H. ZIMMER

11/65-10/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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1GM 12512 2 FIELD 7C, 7B

ADELPHI UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

SELENIUM AROMATIC FREE RADICALS

J. M. DWYER

2/66- 1/67

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1GM 12592 2 FIELD 7C, 7A, 7D,20M

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

PHOTOPROCESSES IN THE ORGANIC SOLID STATE

R. M. HOCHSTRASSER

2/66- 1/67

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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1GM 12692 2 FIELD 7C, 7D

UNIVERSITY OF DELAWARE, GRADUATE SCHOOL, CHEMISTRY, DELAWARE

RING SYNTHESIS FROM VINYL TRIPHENYL PHOSPHONIUM BROMIDE

E. E. SCHWEIZER

2/66- 1/67

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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1GM 13451 1 FIELD 7C, 7A, 7D,20J

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

REACTIVE STATES OF PHOTOEXCITED UNSATURATED KETONES

P. E. EATON

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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1GM 13556 2 FIELD 7C, 7A, 7D,20M

YALE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CONNECTICUT

PROBLEMS IN THEORETICAL CHEMISTRY AND POLYMERS

M. FIXMAN, A. HORTA, N. SNIDER
H. STIDHAM

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

1GM 13638 1 FIELD 7C, 7D, 7A,20M

STANFORD UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

ORGANIC GROUPS IN REDOX REACTIONS OF METAL IONS

H. TAUBE, J. K. HURST, F. R. NORDMEYER R. ROBSON, W. G. SCHMIDT

2/66- 1/67

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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1GM 13651 1 FIELD 7C, 7D,20J

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

AROMATIC, PSEUDOAROMATIC AND ANTIAROMATIC SYSTEMS

R. C. BRESLOW

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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1GM 13854 1 FIELD 7C, 7A, 7D

YALE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CONNECTICUT

REACTIONS OF OXYGEN WITH HETEROCYCLIC SYSTEMS

H. H. WASSERMAN, P. KEEHN

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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1GM 13966 1 FIELD 7C, 7D, 7A,20J

PRECISION PRODUCTION OF ORGANIC TRACERS - REACTION STUDIES

R. D. FINK

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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UNIV OF ALBERTA, GRADUATE SCHOOL, CHEMISTRY, CANADA

THE RADIOLYSIS OF CYSTEINE AND OTHER THIOLS

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STEREOSPECIFIC REACTIONS OF COORDINATED MOLECULES

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SYNTHESIS OF DIAZAPHENANTHRINE ALKALOIDS

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THE NATURE OF THE CRYSTALLINE STATE IN POLYMERS

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THERMODYNAMIC INVESTIGATION OF CHARGE-TRANSFER COMPOUNDS

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DIFFUSION IN ORGANIC CRYSTALS

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POLYMER ADSORPTION

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MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

MOLECULAR STRUCTURES AND CHEMICAL BONDING IN INORGANIC COMPOUNDS

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D. A. DOWS

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THE SOLVENT EXTRACTION BEHAVIOR OF INORGANIC COMPLEXES

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GQF 3814 FIELD 7C, 7D, 7A, 7B

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POLYNUCLEAR HYDROXO COMPLEXES

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N2 A-TRIPLET-SIGMA STATE GENERATED BY 1849 ANGSTROM UNITS MERCURY PHOTOSENSITIZATION

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ELECTROCHEMISTRY OF TRANSITION METAL IONS IN ACETONITRILE

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M. TSUTSUI, M. •. TSUTSUI

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INVESTIGATION OF THERMALLY STABLE STATIONARY PHASES SUITABLE FOR THE ANALYSIS OF COMPLEX LIPID FATTY ACID ESTERS

W. NIEMIADOMSKI

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STUDY OF MIXED LIGAND COMPLEXES OF TRANSITION METALS

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THE OXIDATIVE REARRANGEMENTS OF OXATHIOLANES

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CARBENE FORMATION THROUGH NITROGEN YILEDS

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NEIGHBORING GROUP PARTICIPATION IN THE REACTIONS OF ACETYLENIC COMPOUNDS

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PROPERTIES OF CARBANIONS

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SYNTHESIS OF HIGH POLYMERS THROUGH 1,3-DIPOLAR CYCLOADDITIONS

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A STUDY OF PHOTOCHEMICAL CYCLOADDITION REACTIONS

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THE GAS-PHASE SYNTHESIS OF DIMETHYCHLORAMINE AND ITS REACTION WITH DIMETHYLAMINE

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ABSORPTION SPECTRA OF METAL-AMINE SOLUTIONS

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THE CONFORMATIONAL PREFERENCE OF THE NONBONDING ELECTRON PAIR IN PIPERIDINE

J. B. LAMBERT

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MECHANISM OF ELIMINATION OF WATER FROM P-HYDROXYLAMINE PHENOL BY ELECTROCHEMISTRY

H. B. HERMAN

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STEVENS INST OF TECH, GRADUATE SCHOOL, CHEMISTRY + CHEM ENGIN, NEW JERSEY

FORMATION OF PECULIAR OXIDATION STATES IN FROZEN AQUEOUS GLASSES

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SYNTHESIS OF A STABLE ALLENE EPOXIDE

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AZIDOSULFITES

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MECHANISMS OF REACTIONS OF ORGANOMETALLIC COMPOUNDS IN SOLUTION

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THE OPTICAL ACTIVITY OF OXATHIOLANES AND RELATED COMPOUNDS

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INFLUENCE OF IN-PLANE STRAIN UPON CARBONIUM ION STABILITY

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CHARGE DISTRIBUTION OF INTERMEDIATES IN PHOTOCHEMICAL CYCLOADDITION REACTIONS

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PHOTOLYTIC PREPARATION OF SULFENES

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PCS 450 FIELD 7C, 7D

SYNTHESES AND PROPERTIES OF OXIRENE DERIVATIVES

R. C. KERBER

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PCS 453 FIELD 7C,20M

ENTROPY AND HEAT CAPACITY ANALYSES FOR SYSTEMS INVOLVING HINDERED ROTATION

C. A. WULFF

569-G2
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PCS 461 FIELD 7C, 7A

THE REACTIVITY OF METHYLENE

R. W. CARR

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PCS 463 FIELD 7C, 7B

STRUCTURAL INFLUENCES ON PRIMARY AND SECONDARY HYDROGEN ISOTOPE EFFECTS

J. R. KEEFFE

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PCS 476 FIELD 7C, 7D

CATHOLIC UNIV OF AMER, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, DIST OF COLUMBIA

SIMULTANEOUS COMPETITIVE AND NON-COMPETITIVE ADSORPTIONS IN CATALYTIC REACTIONS - OLEFIN HYDROGENATION

M. M. LIH

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PRW 33 1 FIELD 7C, 7D, 7A, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

RESEARCH ON FRIEDEL-CRAFTS AND RELATED REACTIONS OF ALKYL-ARYL COMPOUNDS

R. M. ROBERTS

F-068
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

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PRW 50 1 FIELD 7C, 7A,20M,20J

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

INFRARED SPECTROSCOPY NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY, MOLECULAR STRUCTURE, + THERMODYNAMIC PROPERTIES OF CHEMICAL COMPOUNDS

A. DANTI, L. L. ALTPETER, F. B. BROWN D. F. KOSTER

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PRW 51 1 FIELD 7C, 7A, 7D

LAMAR ST COLL OF TECH, UNDERGRADUATE SCHOOL, TEXAS

SENECIO ALKALOIDS - SYNTHESIS OF THE NECIC ACIDS

J. D. EDWARDS

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PRW 55 1 FIELD 7C, 7D,20J

TEXAS CHRISTIAN UNIV, GRADUATE SCHOOL, CHEMISTRY, TEXAS

SOME STUDIES OF ORGANIC REACTION MECHANISMS USING CARBON-14

W. B. SMITH, C. GONZALEZ, M. SHOWALTER

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PRW 57 1 FIELD 7C, 7D,20M,20J

UNIV OF HOUSTON, GRADUATE SCHOOL, CHEMISTRY, TEXAS

THE ROLE OF ELECTRON AFFINITY IN CHARGE TRANSFER STABILIZATION OF HYDROGEN BONDING

W. E. WENTWORTH

E-095
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PRW 64 1 FIELD 7C, 7A, 7D,20J

NORTH TEXAS STATE UNIV, GRADUATE SCHOOL, TEXAS

PROPERTIES OF ORGANOMETALLIC COMPOUNDS

W. H. GLAZE

B-105
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PRW 65 1 FIELD 7C,20M,12A,20J

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SOLID STATE MOLECULAR SPECTROSCOPY

R. M. HEDGES

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PRW 66 1 FIELD 7C, 7D,20J, 7B

SAM HOUSTON STATE, UNDERGRADUATE SCHOOL, TEXAS

INVESTIGATIONS ON THE CHEMISTRY OF SULFUR-SULFUR BOND

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PRW 77 1 FIELD 7C, 7D, 7B

SOUTHERN METHODIST, GRADUATE SCHOOL, TEXAS

SUBSTITUENT EFFECTS ON THE ORIENTATION AND REACTIVITY OF THE BENZYNE INTERMEDIATES

E. K. BIEHL

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PRM 82 1 FIELD 7C, 7D

MCMURRY COLLEGE, UNDERGRADUATE SCHOOL, TEXAS

INTERACTION OF ACETYLENIC AMINES WITH KETENE

R. W. SONNTAG

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PRM 90 1 FIELD 7C

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SESQUITERPENE LACTONES

T. J. MABRY

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UT 512 FIELD 7C, 7D,20M, 78

THERMAL DECOMPOSITIONS OF HYPONITRITES

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UT 514 FIELD 7C, 7D,21B, 78

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G. L. BAKER

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UT 523 FIELD 7C, 7D,20J, 78

BROMINATION OF NORBORNYL KETONES

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A STUDY OF THE ISOMERIZATION OF ALPHA OLEFINS DURING THE RITTER REACTION

T. F. MCGRATH

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UT 547 FIELD 7C, 7A, 7D,20J

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SOME ASPECTS OF THE CHEMISTRY OF CERTAIN CYCLOPROPYLCARBINYL REACTION INTERMEDIATES

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EXCITED STATE CONFORMATIONS

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ZUG 853 FIELD 7C,21D, 7D, 7A

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SYNTHESIS OF HIGH-BTU GAS IN A TUBE-WALL REACTOR ENGINEERING DEVELOPMENT

J. H. FIELD, A. J. FORNEY, S. J. GASIOR

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INTERIOR-BUREAU OF MINES

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ZUG 884 FIELD 7C, 7D, 7B

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

SURFACE CHEMISTRY RESEARCH

P. B. LORENZ, E. C. DONALDSON
R. D. THOMAS

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GQA 464 FIELD 7D, 7A, 7B

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INFRARED SPECTRA OF HIGH-BOILING SUBSTANCES INERT MATRICES

R. L. REDINGTON

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DOD-ARMY

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GQF 3411 2 FIELD 7D, 7A,20M, 78

ROYAL INST OF TECHNOL, SWEDEN

SOLUTION CHEMISTRY

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GQF 3515 2 FIELD 7D,20M,20J, 78

UNIVERSITY OF MISSOURI, GRADUATE SCHOOL, CHEMISTRY, MISSOURI

ENERGY EXCHANGE BETWEEN SOLIDS AND GASES

L. B. THOMAS

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GQF 3545 1 FIELD 7D, 7C, 7A, 7B

UNIV OF BIRMINGHAM, UNITED KINGDOM

COMPLEXING PROPERTIES OF INORGANIC SOLVENTS

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AFOSR PROGRAM FOR RESEARCH ON LIQUID STRUCTURE

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GQF 6852 1 FIELD 7D, 7C,20M,11F

GENERAL ELECTRIC CO, SCHENECTADY, NEW YORK

CRYSTAL CHEMISTRY OF NEW HIGH PRESSURE PHASES

J. S. KASPER

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GQF 207209 2 FIELD 7D

UNIV OF LONDON, UNITED KINGDOM

CHROMATOGRAPHY AND SOLVENT EXTRACTION OF ORGANOMETALLIC COMPLEXES

D. A. PANTONY

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GQF 284725 1 FIELD 7D,12A,20J, 78

ATOMIC ABSORPTION SPECTROSCOPY

R. V. STUART

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RESEARCH ON MATRIX ISOLATION

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PRECIPITATION IN ALKALI HALIDE SOLID SOLUTIONS

J. B. NEWKIRK

GK-786
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSP 2208 FIELD 7D

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

TRANSMISSION AND INFLUENCE OF POLAR EFFECTS

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GUE 82 2 FIELD 7D,20M, 8H, 7B

MONSANTO CHEMICAL CO, SANTO CHEMICAL CO EVER, MASSACHUSETTS

PROPERTIES OF SALINE WATER SYSTEMS

B. M. FABUSS

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INTERIOR-OFFICE OF SALINE WATER

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GUE 146 FIELD 7D

GENERAL DYNAMICS CORP, SAN DIEGO, CALIFORNIA

DESIGN STUDY OF PROTOTYPE FOR MILLION GPD REVERSE OSMOSIS PLANT

U. MERTEN, H. MENZEL, T. F. UNKLE

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INTERIOR-OFFICE OF SALINE WATER

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GUE 165 FIELD 7D,20M, 7B

THE MEASUREMENT OF EVAPORATION AND CONDENSATION COEFFICIENTS OF WATER UNDER EQUILIBRIUM CONDITIONS

R. W. COUGHLIN

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GUE 166 FIELD 7D, 7A,14E,20M

BEHAVIOR OF LIQUID SURFACES DURING EVAPORATION AND CONDENSATION

K. C. HICKMAN, A. DAVIDHAZY, J. R. MAA O. MADY

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NG 26 FIELD 7D, 7C, 7A,20J

PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

THE KINETIC ISOTOPE EFFECT

R. E. DAVIS, R. KENSON

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PCS 364 FIELD 7D

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, CHEMISTRY, MARYLAND

IR SPECTROSCOPIC STUDIES OF CLUSTER FORMATION IN BINARY LIQUID MIXTURES

A. ALLERHAND

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PCS 406 FIELD 7D, 7B

UNIVERSITY OF GEORGIA, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

ULTRAVIOLET AND VISIBLE SPECTRA OF METAL CARBONYL DERIVATIVES

G. R. DOBSON

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PCS 415 FIELD 7D,20J

CONFORMATIONAL ANALYSIS BY INFRARED SPECTROSCOPY

G. A. CROWDER

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PCS 433 FIELD 7D,20J

SOLVOLYSIS STUDIES IN STRAINED RING SYSTEMS

F. B. MILES

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PCS 443 FIELD 7D,20D

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, CHEMISTRY + CHEM ENGIN, ILLINOIS

TRANSPORT WITH HOMOGENEOUS CHEMICAL REACTION IN A TURBULENT BOUNDARY LAYER

J. L. HUDSON

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PCS 452 FIELD 7D,20M

MOLECULAR SPECTROSCOPY AT VERY HIGH PRESSURES

M. F. NICOL

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PCS 456 FIELD 7D, 7B

THE DONOR PROPERTIES OF TELLURIUM TOWARD TRANSITIONAL METAL IONS

M. M. BADDLEY

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PCS 460 FIELD 7D,20J

STUDY OF THE CONTRIBUTION OF INTERMOLECULAR DIPOLE-DIPOLE INTERACTIONS TO NUCLEAR MAGNETIC RELAXATION

K. F. KUHLMANN

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PRW 12 1 FIELD 7D,20M,20J, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

ELECTRICAL DOUBLE LAYER - PASSIVITY

N. HACKERMAN

F-032
11/64-10/65

WELCH, ROBERT A FOUNDATION-TEXAS

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UT 559 FIELD 7D, 7B

SAN DIEGO STATE COLL, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

O HYPOFLUORITES AS SELECTIVE FLUORINATING AND OXIDIZING AGENTS

C. M. SHARTS

HYPOFLUOROUS ACID AN
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ZQA 232 1 FIELD 7D, 8H, 7B

USA, CHEM CORPS, EDGEWOOD ARSENAL, MARYLAND

RADIOCHEMICAL ANALYSIS

C. CRISCO, H. MORTKO

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ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQF 284892 1 FIELD 7D,20J,20F

USAF, AFSC, RTD, WRIGHT-PATT-AF MAT LAB, OHIO

STUDIES IN ATOMIC ABSORPTION SPECTROSCOPY

J. H. MUNTZ

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ZT 58 4 FIELD 7D, 7B

TENN VALLEY AUTHORITY, TENNESSEE

USE OF STRONG SULFURIC ACID IN PRODUCTION OF PHOSPHORIC ACID

M. R. SIEGEL

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TENNESSEE VALLEY AUTHORITY

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ZT 68 4 FIELD 7D, 7B

TENN VALLEY AUTHORITY, TENNESSEE

TECHNOLOGY OF WET-PROCESS PHOSPHORIC ACID

J. G. GETSINGER

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ZUG 790 FIELD 7D,20J, 5A, 7B

USDI, BUR MINES, ROLLA, MISSOURI

MOLECULAR COMPOSITION OF METAL HALIDE VAPORS

J. W. JENSEN, R. T. DEWOODY
A. E. SCHWANEKE, A. VISNAPUU

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ZUG 876 FIELD 7D,21D, 8D,20J

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

PETROLEUM COMPOSITION RESEARCH APPLIED TO PETROLEUM PRODUCTION

C. W. DWIGGINS, D. A. DOUGHTY
H. J. HEEMSTRA, K. WILLCOX

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08 EARTH SCIENCES AND OCEANOGRAPHY

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MAGNETIC FIELD EXPERIMENT TO BE FLOWN IN JAVELIN ROCKETS AT FORT CHURCHILL

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PRINCETON UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW JERSEY

RESEARCH ON DEFORMATION OF MACROPARTICLE SOIL SYSTEMS UNDER STATIC AND TRANSIENT LOADINGS

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STUDY DEFORMATION BEHAVIOR OF NATURAL SOIL SURFACES + SUBSTRATA UNDER DYNAMIC WHEEL LOADS

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GQF 258590 1 FIELD 4A

OPERATE CONTINUOUS VARIABLE AREA MAGNETOGRAPHS AND PERFORM RELATED RESEARCH

I. A. GIESECKE

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GQF 258945 FIELD 8+, 9+, 9A

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THEORETICAL + EXPERIMENTAL STUDIES OF TERRESTRIAL SURFACE EM WAVES ALONG VARIOUS TERRAINS

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DEVELOPMENT AND CONSTRUCTION OF TWO RUBIDIUM VAPOR MAGENTOMETERS FOR USE IN ROCKETS

R. MORRIS

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GQF 259769 2 FIELD 8+, 9+

STUDY OF SFERICS INTENSITY + LOCATION IN SO. NEW ENGLAND USING A TWO STATION TECHNIQUE

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EXPERIMENTAL STUDY OF SOIL SHEAR

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A STUDY OF THE SHOCK EFFECTS ON GRANULAR LOCKING BODIES

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UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

STUDY OF SANDS SUBJECTED TO DYNAMIC AND RAPID LOADING TO HIGH STRESS LEVELS

M. T. DAVISSON

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IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

STRESS WAVE PROPAGATION IN CONFINED SOILS

E. SELIG, D. HAMPTON

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DEVELOPMENT OF X-RAY TECHNIQUES FOR DETECTING SOIL MOTION

F. JANZA

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DEVELOPMENT OF A PIEZORESISTIVE SOIL STRESS GAGE

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PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, INDIANA

FUNDAMENTAL CONCEPTS IN THE BEHAVIOR OF PARTLY SATURATED CLAYS

A. G. ALTSCHAEFFL

9/65- 9/66

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ZQN 544217 1 FIELD 13B,12A,20D

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

UNIFIED CONSOLIDATION THEORY

J. P. NIELSEN, J. A. BISHOP

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USDI, GEOL SURV PHOENX, ARIZONA

DEVELOPMENTS IN ELECTRIC ANALOGS

H. E. SKIBITZKE, R. M. BROWN
G. M. ROBINSON

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INTERIOR-GEOLOGICAL SURVEY

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PHOTOGRAMMETRIC ACCURACY TESTING

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ZUA 832 FIELD 13B

USDI, GEOL SURVEY, DENVER, COLORADO

USE OF SMALL-SCALE PHOTOGRAPHY FOR MAPPING

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MAPPING FROM COLOR AERIAL PHOTOGRAPHY

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ZUG 840

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

AIRFLOW CHARACTERISTICS OF FLEXIBLE TUBING

R. G. PELUSO, R. W. DALZELL, W. KEBBLISH

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GQF 2222 4 FIELD 7D, 7A,20M, 8D

PENNSYLVANIA ST UNIV, SCHOOL OF MINERAL IND, GEOCHEM + MINERALOGY, PENNSYLVANIA

REACTION MECHANISMS AND KINETICS IN SOLID PHASE REACTIONS IN

R. ROY

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BROWN UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, RHODE ISLAND

RESEARCH ON THE FREQUENCY + COMPOSITION OF METEORITIC SPHERULES IN ANCIENT SALT DEPOSITS

T. A. HUTCH

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DOD-AIR FORCE

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GQF 258721 4 FIELD 13B, 7D, 8D, 8F

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

STUDY ROLE OF CLAY MINERALS IN LANDSLIDE MOVEMENTS + MEASURE IN REFLECTION PROPERTIES OF CLAY

P. F. KERR

AF-19-604-08387
/65- /

DOD-AIR FORCE

****

GQF 550209 1 FIELD 8D, 8G

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DEVELOPMENT OF INDICES RELATING THE PHYSICAL PROPERTIES AND THE ENGINEERING BEHAVIOR OF ROCK

D. U. DEERE

AF-29-601-6319
/65- /

DOD-AIR FORCE

****

GSB 4094 7 FIELD 8C, 8G

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, PALEONTOLOGY, CALIFORNIA

PALEONTOLOGY AND STRATIGRAPHY OF THE TERTIARY AMBER-BEARING BEDS OF CHIAPAS MEXICO

J. W. DURHAM, R. C. ALLISON

NSF-GB-1127
6/65- 6/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

****

GSB 4537 FIELD 8D

CAL INST OF TECHNOLOGY, GRADUATE SCHOOL, GEOLOGICAL SCIENCES, CALIFORNIA

CATALOGING AND INDEXING OF APPROXIMATELY ONE MILLION SPECIMENS OF SILURIAN-DEVONIAN BRACHIOPODS

A. J. BOUCOT, J. G. JOHNSON

NSF-GB-4491
12/65-12/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

****

GSB 5022 FIELD 8C

QUATERNARY ENVIRONMENTS AND BIOTAS

C. L. HUBBS

NSF-GB-4616
1/66- 1/67

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

****

GSS 808 FIELD 8D

THE INFLUENCE OF THE WORK OF ABRAHAM GOTTLOB WERNER ON THE DEVELOPMENT OF THE SCIENCE OF GEOLOGY

A. M. OSPOVAT

NSF-GS-832
6/65- 9/66

NSF-SOCIAL SCIENCES DIVISION

****

GUW 517 FIELD 8D, 8N, 8K, 8

IOWA ST UNIV SCI TECH, GRADUATE SCHOOL, GEOLOGY, IOWA

GEOLOGY OF THE REGOLITH AQUIFERS OF THE NISHNABOTNA BASIN

K. M. HUSSEY, L. V. SENDLEIN

INT-WR-A-012-IA
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

****

GUW 529 FIELD 8C, 8H,12A, 8

NUMERICAL MODELING OF GROUND-WATER FLOW

C. WEINAUG

INT-WR-A-002-KAN
6/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

****

NP 20 FIELD 8D, 8G

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, GEOLOGY, COLORADO

TECTONICS AND STRUCTURAL GEOLOGY OF THE SIERRA CUCAPAS, NORTHEASTERN BAJA CALIFORNIA, MEXICO

F. BARNARD

/66- /

COLORADO, UNIVERSITY OF

****

PCS 482 FIELD 8D, 8H, 8G

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, GEOLOGY, MARYLAND

CHEMICAL BEHAVIOR OF THE ROCK-FORMING SILICATE MINERALS IN THE NATURAL WATER ENVIRONMENT

O. P. BRICKER

665-G2
9/65- 8/66

PETROLEUM RESEARCH FUND-AMER CHEM SOC

****

PRW 4 1 1 FIELD 8D, 8G, 7B

RICE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, TEXAS

GEOCHEMISTRY OF THORIUM

J. A. ADAMS, J. J. ROGERS

C-009
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

****

ZUA 625 3 FIELD 7A, 7D, 8D, 8

USDI, GEOL SURVEY, DENVER, COLORADO

COBALT - + OTHER HEAVY METAL - SORPTION BY MANGANESE AND IRON OXIDES

E. A. JENNE

INT-GS-RMA-137-F
/66- /

INTERIOR-GEOLOGICAL SURVEY

****

ZUA 822 FIELD 8D, 8H, 8G

USDI, GEOL SURV, DIST OF COLUMBIA

GEOLOGIC ASPECTS OF SEA-WATER ENCROACHMENT

J. E. UPSON

HRD-18-T
/66- /

INTERIOR-GEOLOGICAL SURVEY

****

ZUA 831 FIELD 8D, 8H, 8G

GEOHYDROLOGY OF THE POTOMAC-RARITAN-MAGOTHY AQUIFER SYSTEM

M. E. GILL, D. LANGMUIR

INT-GS-NJ-31-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

****

ZUA 850 FIELD 7D,20N, 8D, 8F

SPRINGS OF UTAH

J. C. MUNDORFF

INT-GS-UTAH-8-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

****

ZUG 784 FIELD 7D, 8D,11F,20D

USDI, BUR MINES, SAN FRANCISCO, CALIFORNIA

PILOT STUDY OF DEPOSITION AND PREVENTION OF BARIUM SULFATE SCALE IN PRODUCING WELLS

J. W. WATKINS, W. H. CARAWAY, G. L. GATES

INT-BM-13-1598-D
/65- /

INTERIOR-BUREAU OF MINES

****

ZUG 803 FIELD 19D,21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

SUPPRESSION OF COAL DUST AT SOURCE BY USE OF FOAM

F. G. ANDERSON

INT-BMHS-20-14
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 808 FIELD 8D,20D,10B

HYDRAULIC MINING JET STUDIES

J. W. CHESTER

INT-BM-6111531-15
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 811 FIELD 7C,21B, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

METHANE MONITOR COMPONENT DEVELOPMENT

E. J. COGGESHALL, R. A. BRADBURN
M. JACOBSON, M. J. PAZUCHANICS
L. W. SCOTT, R. A. WOLF

INT-BMHS-10-11
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 814 FIELD 8D

USDI, BUR MINES, DENVER, COLORADO

STRESS CONCENTRATION IN INCLINED MINERAL DEPOSITS

W. L. DARE

INT-BM-6111521-17
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 819 FIELD 8D,20L

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

UNDERGROUND AIR CONDITIONING

E. J. HARRIS, F. F. KAPSCH, J. W. WARREN

INT-BMHS-61-15
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 824 FIELD 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

HIGH CAPACITY AUXILIARY EQUIPMENT IN FACE VENTILATION

W. KEBBLISH, R. W. DALZELL
J. W. STEVENSON

INT-BMHS-61-13
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 826 FIELD 7C,21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FACE AIRFLOW PATTERNS RESULTING FROM LINE BRATTICE SYSTEMS

J. V. LUXNER, J. W. STEVENSON

INT-BMHS-61-12
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 827 FIELD 8C

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

EFFECT OF ANGULAR INSTALLATION ON MINE-ROOF BOLTS

J. A. MCCORMICK, J. B. SHUTACK

INT-BMHS-30-11
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 828 FIELD 8C

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

RESIN ANCHORED ROOF BOLTS

J. A. MCCORMICK, J. B. SHUTACK
J. H. STEARS

INT-BMHS-30-12
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 830 FIELD 8C

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

EXPLOSIVE-ANCHORED BOLT

J. A. MCCORMICK, N. E. HANNA
J. B. SHUTACK

INT-BMHS-30-14
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 831 FIELD 8D,20K

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

DEVELOPMENT OF A HYDRAULIC BOLT-TENSION INDICATOR

J. A. MCCORMICK, J. B. SHUTACK
R. SPORCIC

INT-BMHS-30-15
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 833 FIELD 8D, 8F, 9F, 9A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

SONIC EXPLORATION OF COAL-MINE ROOF STRATA

T. C. MILLER, C. E. MONGAN

INT-BMHS-30-17
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 834 FIELD 7C,21B, 8D,11C

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FIRE HAZARD OF URETHANE FOAM IN MINES

D. W. MITCHELL, E. M. MURPHY

INT-BMHS-60-11
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 835 FIELD 19D,21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FLOAT DUST TRANSPORT AND DEPOSITION

D. W. MITCHELL, M. L. BOWSER
G. J. DVORZNAK, E. M. MURPHY

INT-BMHS-60-14
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 839 FIELD 8D, 8G,20D,20K

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FLUID PRESSURE AND ROOF STABILITY

R. H. DITTO, J. L. BANFIELD

INT-BMHS-30-16
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 847 FIELD 7C, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

STUDY OF HEAT FLOW IN THE EARTHS CRUST + CONDUCTIVITY COEFFICIENT IN ROCK MATERIALS

W. F. BRACE

AF-19-628-03298
/65- /

DOD-AIR FORCE

****

GGF 259487 FIELD 1B, 8G

AEROFLEX LABS INC, LONG ISLAND, NEW YORK

PROVIDE TECH REP SERVICE FOR STABILIZED PLATFORMS IN AFCRL AIRBORNE GRAVITY PROGRAM

, NONE

AF-19-628-04778
/65- /

DOD-AIR FORCE

****

GGF 259544 1 FIELD 8G

USDI, GEOL SURV, DIST OF COLUMBIA

USAF CONTRIBUTION TO BASIC RSCH PROGRAM IN GEOTHERMAL STUDIES SPONSERED BY AFCRL USGS + ONR

A. LACHENBRUCH

PRO-00506-65
/65- /

DOD-AIR FORCE

****

GGF 550203 1 FIELD 13G, 8G

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

BEHAVIOR OF SOIL AND ROCK UNDER HIGH PRESSURE

R. H. CORNISH

AF-29-601-6411
/65- /

DOD-AIR FORCE

****

GGN 544113 FIELD 8G, 8H

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DEEP-SEA SEDIMENTS STUDIES

A. F. RICHARDS

NONR3985-09
/65- /

DOD-NAVY

****

GSP 2517 FIELD 7D, 8G, 7B

GRAD RES CTR OF S-WEST, TEXAS

CONSTRUCTION OF A MASS SPECTROMETER FOR POTASSIUM-ARGON ANALYSIS

H. FAUL, H. +. FAUL

NSF-GP-4170
2/65- 2/66

NSF-PHYSICAL SCIENCES DIVISION

****

GYE 360133 FIELD 13B, 8G

OREGON STATE UNIV, AGRICULTURAL EXPT STA, SOILS, OREGON

IDENTIFICATION AND CHARACTERIZATION OF CLAY MINERAL SPECIES IN SOILS OF THE WESTERN REGION

. NONE

AG-ORE-0769
7/65- 6/66

AGRICULTURE-DEPT OF AGRICULTURE

****

PCS 428 FIELD 8G

ELECTRON MICROSCOPY OF PELAGIC LIMESTONES

R. E. GARRISON

515-G2
9/65- 8/66

PETROLEUM RESEARCH FUND-AMER CHEM SOC

****

ZPE 1600 FIELD 13B, 8G,20D

EXCHANGE-DIFFUSION IN SOILS

G. E. SPALDING, R. G. GAST

AT(40-1)242
/66- /

AEC-BIOLOG. + MEDICINE

****

ZUG 815 FIELD 8G, 8D,20L, 5A

TRANSITIONAL PHASE - FUNDAMENTAL BLASTING, DYNAMIC EQUATION OF STATE, AND MECHANICS OF PRESPLITTING

D. E. FOGELSON

INT-8M-6111531-9
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 820 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

IN SITU STRESS IN ROCK OUTCROPS

V. E. HOOKER

INT-8M-6111521-12
/66- /

INTERIOR-BUREAU OF MINES

****

GSB 5151 FIELD 8H

WOODS HOLE OCEANOGRAPH, MASSACHUSETTS

SUPPORT OF RESEARCH VESSELS FOR RESEARCH IN THE MARINE SCIENCES

P. M. FYE

GB-286
2/66- 2/67

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

****

GSB 5153 FIELD 8H

OREGON STATE UNIV, GRADUATE SCHOOL, OCEANOGRAPHY, OREGON

OREGON OCEANOGRAPHIC STUDIES

W. V. BURT

GB-295
2/66- 2/67

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

****

GSB 5154 FIELD 8H

OREGON STATE UNIV, GRADUATE SCHOOL, OCEANOGRAPHY, OREGON

STUDENT RESEARCH TRAINING AT THE MARINE SCIENCE CENTER

J. W. HEDGPETH

GB-4792
2/66- 2/67

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

****

GSB 5155 FIELD 8H

UNIV OF RHODE ISLAND, GRADUATE SCHOOL, OCEANOGRAPHY, RHODE ISLAND

PARTIAL SUPPORT OF R/V TRIDENT

J. A. KNAUSS

GB-5654
2/66- 2/67

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

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GSE 803 FIELD 8H

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

RAINFALL AND RUNOFF SEQUENCES IN ENGINEERING HYDROLOGY

V. M. YEVDJEVICH, M. M. SIDDIQUI

NSF-GK-169
3/65- 3/66

NSF-ENGINEERING SCIENCES DIVISION

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GUW 356 FIELD 7D, 8H, 7B

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, DESERT RESEARCH INST, NEVADA

GROUND-WATER FLOW SYSTEM ANALYSIS IN MOUNTAINOUS TERRAIN OF NEVADA

M. D. MIFFLIN, G. B. MAXEY

INT-WR-A-009-NEV
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

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GUW 399 FIELD 7D, 8H, 7B

ANALYSIS OF NATURAL RADIOELEMENTS IN RAW WATER

V. C. ROSE

INT-WR-A-011-R-1
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

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GUW 417 1 FIELD 13G, 8H,12A, 8E

WASHINGTON STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WASHINGTON

DETERMINATION OF FLOWS FOR UNGAGED STREAMS

D. L. BENDER, D. L. SCHREIBER

A-009-WASH
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

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GUW 516 FIELD 13B, 8H, 8G, 5A

IOWA ST UNIV SCI TECH, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, IOWA

MOVEMENT OF RADIONUCLIDES THROUGH SOIL FORMATIONS

C. S. OULMAN, L. V. SENDLEIN, M. D. VOSS

INT-WR-A-011-IA
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

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NGI 24 FIELD 8H

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, ENGIN EXPT STATION, GEORGIA

A STUDY OF GEORGIA RIVERS AND LAKES

R. S. INGOLS

E-104
1/66- 1/67

GEORGIA INSTITUTE OF TECHNOLOGY

•••••••••

YIN 158 1 FIELD 13G,13F, 8H

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, INDIANA

HYDROLOGY OF SMALL WATERSHEDS IN INDIANA

J. W. DELLEUR

/65- /

STATE-INDIANA

•••••••••

YNM 78 1 FIELD 8H

NEW MEX INST MIN + TEC, GRADUATE SCHOOL, GROUNDWATER HYDROLOGY, NEW MEXICO

BANK STORAGE OWING TO FLOOD STAGES IN SURFACE STREAMS

M. S. HANTUSH

/65- /

STATE-NEW MEXICO

•••••••••

YNM 81 1 FIELD 8H

NEW MEX INST MIN + TEC, GRADUATE SCHOOL, GROUNDWATER HYDROLOGY, NEW MEXICO

EXPERIMENTAL VERIFICATION OF THEORETICAL SOLUTIONS FOR SEVERAL GROUND-WATER FLOW PROBLEMS

M. S. HANTUSH

/65- /

STATE-NEW MEXICO

•••••••••

ZQN 544084 FIELD 13B, 8H

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

ABLATION INVESTIGATIONS IN ICE AND SNOW

N. S. STEHLE

/65- /

DOD-NAVY

•••••••••

ZQN 544175 1 FIELD 13J, 7C, 7D, 8H

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

SIMULATED DEEP OCEAN ENVIRONMENTAL LABORATORY

J. D. STACHIW, K. O. GRAY

/65- /

DOD-NAVY

•••••••••

ZT 110 2 FIELD 20M, 8H,20D

TENN VALLEY AUTHORITY, TENNESSEE

BASIC STREAM AND RESERVOIR HEAT BUDGET STUDIES

• NONE

/66- /

TENNESSEE VALLEY AUTHORITY

•••••••••

ZT 119 1 FIELD 8H, 8E,12A

TENN VALLEY AUTHORITY, TENNESSEE

DEVELOPMENT OF HYDROLOGIC ANALYSIS TECHNIQUES

• NONE

/66- /

TENNESSEE VALLEY AUTHORITY

•••••••••

ZUA 653 3 FIELD 7D, 8H, 8G, 8+

USDI, GEOL SURVEY, DENVER, COLORADO

MULTIPHASE FLOW THEORY APPLICATION

R. W. STALLMAN

RMA-146-F
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 814 FIELD 8H, 8G,12A, 8E

USDI, GEOL SURV, DIST OF COLUMBIA

DIGITAL COMPUTER METHOD FOR COMPUTING SEDIMENT DISCHARGE

M. D. EDWARDS

ACA-15-F
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 819 FIELD 13G, 8H, 8G,12A

USDI, GEOL SURVEY, FORT COLLINS, COLORADO

LONGITUDINAL DISPERSION OF SILT-SIZE SEDIMENT PARTICLES IN TURBULENT OPEN-CHANNEL FLOW

W. W. SAYRE

RMA-104-F
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 821 FIELD 8H,12A, 8E,13M

USDI, GEOL SURV ARLGTN, VIRGINIA

SYSTEMS ANALYSIS OF HYDROLOGIC PROCESSES

E. J. GILROY, N. C. MATALAS, G. F. SMOOT

ACA-31-F
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 824 FIELD 13G, 8H, 8G,20L

USDI, GEOL SURVEY, FORT COLLINS, COLORADO

FALL VELOCITY OF FLUVIAL SEDIMENT PARTICLES IN A TURBULENT FIELD

D. D. ZIMBELMAN

RMA-153-F
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 835 FIELD 8H, 5C, 8E

EVAPORATION LOSSES FROM LAKES IN INDIANA

R. E. HOGGATT

INT-GS-IND-8-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 845 FIELD 8H,12A

PEAK RUNOFF MEASUREMENT BY DIGITAL-RECORDING POND GAGES

J. E. MCCALL

INT-GS-NJ-34-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 851 FIELD 8H

HYDROLOGY OF UPPER BUFFALO RIVER BASIN

W. J. PERRY

INT-GS-TENN-22-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 863 FIELD 8H

USDI, GEOL SURV, DIST OF COLUMBIA

FLOOD-FREQUENCY - AND BASIN PARAMETER RELATIONSHIPS IN SMALL DRAINAGE AREAS

W. P. SOMERS

INT-GS-WRD-21-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

ZUA 864 FIELD 8H, 8G

RELATING SEDIMENT YIELDS TO WATERSHED VARIABLES - SUSQUEHANNA RIVER BASIN

K. F. WILLIAMS

INT-GS-PA-34-CO
/66- /

INTERIOR-GEOLOGICAL SURVEY

•••••••••

GQF 6876 1 FIELD 8K, 8G

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, NEW YORK

MEASUREMENT OF P + S SOUND VELOCITIES UNDER PRESSURE ON LAB MODELS OF THE EARTHS MANTLE

O. L. ANDERSON

AF-49-638-01355
/65- /

DOD-AIR FORCE

****

GQF 6924 1 FIELD 8K, 9A

NEW MEX INST MIN + TEC, GRADUATE SCHOOL, PHYSICS + GEOPHYSICS, NEW MEXICO

RESEARCH ON SHORT PERIOD MICROSEISMS

A. R. SANFORD

AF-AFOSR-0658-64
/65- /

DOD-AIR FORCE

****

GQF 258226 2 FIELD 8K, 8+,12A, 9C

INVESTIGATE PROPERTIES AND STATISTICS OF EVENTS RECORDED OVER SMALL SEISMIC ARRAY IN NEW ENGLAND

R. HOLT

AF-19-628-02776
/65- /

DOD-AIR FORCE

****

GQF 259481 FIELD 8K

RESEARCH ON DETERMINATION OF DEPTH OF FOCUS AND MAGNITUDE USING SELECTED EARTHQUAKE PHASE ARRIVALS

D. H. SHURBET

AF-EOAR-0705-64
/65- /

DOD-AIR FORCE

****

GQF 259532 1 FIELD 8K

UNIV OF UPPSALA, SWEDEN

RESEARCH IN SEISMOLOGY WAVES + THEORETICAL SEISMOLOGY

M. BATH

AF-61-052-00702
/65- /

DOD-AIR FORCE

****

GQF 550197 2 FIELD 8K,12A, 8E,20H

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DEVELOPMENT FOR A MODEL TO SIMULATE FREE-FIELD GROUND MOTIONS

N. NEWMARK, A. ANG

AF-29-601-05851
/65- /

DOD-AIR FORCE

****

GQQ 810002 FIELD 8K, 8G, 8H

USDI, GEOL SURV, DIST OF COLUMBIA

CRUSTAL STUDY IN NORWAY

J. HEALY

/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

****

PCS 409 FIELD 8K

MASS INST OF TECHNOL, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, MASSACHUSETTS

AN EXPERIMENTAL AND THEORETICAL STUDY OF SEISMIC ARRAYS

A. F. GANGI

458-G2
9/65- 8/66

PETROLEUM RESEARCH FUND-AMER CHEM SOC

****

ZUG 821 FIELD 8K, 8D

USDI, BUR MINES, DENVER, COLORADO

PROPAGATION VELOCITY AND ROCK STABILITY

V. E. HOOKER

INT-BM-6111521-13
/66- /

INTERIOR-BUREAU OF MINES

****

GQF 258054 FIELD 8N, 8G, 4A

USDC, CST + GEOD SURV, DIST OF COLUMBIA

CONSTRUCTION OF INSTRUMENT SHELTER FOR RECORDING MAGNETOMETER

R. W. KUBERRY

PRO-00519-65
/65- /

DOD-AIR FORCE

****

GQF 258122 2 FIELD 22C, 8N, 4A,12A

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, GEODETIC SCIENCE, OHIO

COMPUTE ELEVATED GRAVITY PROFILES + THEIR ACCURACIES + COMPUTE SURFACE MEAN ANOMALIES

W. A. HEISKANEN

AF-19-628-02771
/65- /

DOD-AIR FORCE

****

GQF 258124 2 FIELD 8N, 8G

UNIVERSITY OF HAWAII, GRADUATE SCHOOL, GEOPHYSICS, HAWAII

PERFORM OBSERVATIONS FOR PROGRAM TO DEVELOP A WORLD GRAVITY CALIBRATION STANDARD

G. P. WOOLLARD

AF-19-628-02849
/65- /

DOD-AIR FORCE

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GQF 258588 FIELD 8N, 8G,20J,20F

USDC, NATL BUR STAN, DIST OF COLUMBIA

DEVELOP ABSOLUTE GRAVITY MEASURING EQUIPMENT BASED UPON LASER-INTERFEROMETER PRINCIPLES

J. FALLER

PRO-00526-65
/65- /

DOD-AIR FORCE

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GQF 258727 1 FIELD 13B, 8N, 8F, 8K

STANFORD UNIVERSITY, GRADUATE SCHOOL, GEOPHYSICS, CALIFORNIA

STUDY OF THE CRUSTAL MOVEMENTS IN THE BASIN-RANGE AREA OF CALIFORNIA + NEVADA

G. A. THOMPSON

AF-19-628-03867
/65- /

DOD-AIR FORCE

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GQF 258911 1 FIELD 8N,20H,20J

MARTIN CO., ORLANDO,, FLORIDA

THEORETICAL + EXPERIMENTAL STUDIES ON THE CHARGED PARTICAL TECHNIQUE FOR PRECISE ABSOLUTE GRAVITY DATA

R. CUNNINGHAM

AF-19-628-03992
/65- /

DOD-AIR FORCE

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GQF 259349 FIELD 3A, 8N, 4A

BOSTON COLLEGE, GRADUATE SCHOOL, MASSACHUSETTS

COLLECTION AND EVALUATION OF TERRESTRIAL + SPATIAL MAGNETIC FIELD DATA

J. F. DEVANE

AF-19-628-04793
/65- /

DOD-AIR FORCE

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ZQF 260072 FIELD 22C, 8N, 4A,12A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

GRAVITY FOR WEAPON SYSTEMS AND NAVIGATION REQUIREMENTS

B. SZABO

/65- /

DOD-AIR FORCE

09 ELECTRONICS AND ELECTRICAL ENGINEERING

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GQF 1170 5 FIELD 12A,20J

CAMBRIDGE LANG RES, UNITED KINGDOM

A SEQUENTIAL LOGIC FOR INFORMATION STRUCTURE

E. W. BASTIN

AF-EOAR-0078-65
/65- /

DOD-AIR FORCE

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GQF 259123 FIELD 9+, 9A,12A, 9C

USDC, NATL BUR STAN, BOULDER, COLORADO

STUDY OF ANTENNA PATTERNS IN THE PRESENCE OF FINITE GROUND SURFACES

J. R. WAIT

PR/-00504-65
/65- /

DOD-AIR FORCE

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ZQF 260038 FIELD 9+,20F,20J

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ELECTROMAGNETIC NETWORKS AND FIELDS

E. J. POST

/65- /

DOD-AIR FORCE

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GQQ 8803 FIELD 9+, 9A,12A, 9D

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

REMOTE + STATION COMPUTER PROJECT

D. C. EVANS, H. D. HUSKEY

/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GSE 890 FIELD 9+, 9A

NONLINEAR BEHAVIOR OF FIELD EFFECT TRANSISTORS

F. C. FITCHEN

NSF-GK-733
12/65-12/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 893 FIELD 9+, 9A,12A

SYRACUSE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

A GENERAL PROGRAM FOR DETERMING WAVEGUIDE CHARACTERISTICS

R. F. HARRINGTON

NSF-GK-704
11/65-11/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 896 FIELD 9+, 9A,12A

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

SPHERICAL AND RELATED NON-PLANAR ARRAYS

Y. T. LO

NSF-GK-714
12/65-12/66

NSF-ENGINEERING SCIENCES DIVISION

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NG 99 FIELD 12A, 5C

PURDUE UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, INDIANA

PROBLEMS OF CONTROL AND PROGRAMMING

L. BERKOVITZ, D. SABBACH

7/65- 6/66

PURDUE UNIVERSITY

10 ENERGY CONVERSION (NON-PROPULSIVE)

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GQA 450 1 FIELD 7C, 7D, 7A,20L

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

ENERGY CONVERSION PROCESSES IN ORGANIC MOLECULAR CRYSTALS

D. R. KEARNS

DA-ARO-D-31-124-G511
/65- /

DOD-ARMY

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GQF 3322 3 FIELD 20M,11B,11F,11G

WESTINGHOUSE RES LAB, PENNSYLVANIA

THERMAL CONDUCTIVITY AND THERMOELECTRIC POWER OF SOLIDS AT LOW TEMPERATURES

P. G. KLEMENS

AF-49-638-01589
/65- /

DOD-AIR FORCE

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GQF 258795 2 FIELD 7C, 7D, 9+, 9C

STUDY OF THERMAL ENERGY CONVERSION AND STORAGE SYSTEMS

A. J. ROSENBERG

AF-19-628-02845
/65- /

DOD-AIR FORCE

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NG 96 FIELD 9+, 9C, 9A

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, INDIANA

A P-I-N PHOTOVOLTAIC DEVICE FOR STATIC ENERGY CONVERSION

R. J. SCHWARTZ, C. W. KIM

7/65- 6/66

PURDUE UNIVERSITY

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ZQN 544137 FIELD 9+, 9C, 9A

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

POWER SYSTEMS SWITCHING

H. H. KASIHARA

/65- /

DOD-NAVY

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ZT 40 4 FIELD 9+, 9C

TENN VALLEY AUTHORITY, TENNESSEE

USE OF VOLTAGE PHASE ANGLES FOR INCREMENTAL TRANSMISSION LOSS DETERMINATIONS

J. H. GILBREATH, J. R. HUFF

/66- /

TENNESSEE VALLEY AUTHORITY

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ZT 48 4 FIELD 9C, 9+

TENN VALLEY AUTHORITY, TENNESSEE

SHORT-TERM (24HOUR) ELECTRICAL LOAD PREDICTIONS

C. J. POWELL

/66- /

TENNESSEE VALLEY AUTHORITY

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ZT 85 2 FIELD 9+, 9C

TENN VALLEY AUTHORITY, TENNESSEE

ESTIMATES OF DISTRIBUTION TRANSFORMER AND CIRCUIT LOADS FROM CONSUMER ENERGY USE

W. R. NEW

/66- /

TENNESSEE VALLEY AUTHORITY

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GQF 207570 FIELD 20D, 5A,10B

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

INTERNAL FLOW STUDIES PERTINENT TO ENERGY CONVERSION

M. KELLER

/65- /

DOD-AIR FORCE

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GSE 795 FIELD 9C,10B,20L

UNIV OF ROCHESTER, SCHOOL OF ENGINEERING, AEROSPACE + MECH SCI, NEW YORK

CONVERSION OF HEAT INTO ALTERNATING CURRENT

H. S. DUNN

NSF-GK-178
3/65- 3/66

NSF-ENGINEERING SCIENCES DIVISION

11 MATERIALS

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GH 629 1 FIELD 7C

UNIV OF NOTRE DAME, GRADUATE SCHOOL, PHYSICS, INDIANA

POLYMER RESEARCH PROGRAM

G. F. DALELIO

NASA-NSG-339-E-4
2/64- 1/65

NASA

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GQF 3537 2 FIELD 7A, 7D,20M, 7B

AEROCHEM. RES. LAB., NEW JERSEY

OXIDATION OF METALS BY PARTIALLY DISSOCIATED OXYGEN

D. E. ROSNER

AF-33-615-02778
/65- /

DOD-AIR FORCE

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GQF 284966 FIELD 20M,11B,13H,20L

LEXINGTON LAB., INC., MASSACHUSETTS

RUBIES FOR REFERENCE TEMPERATURE STANDARDS

P. S. SCHAFFER

AF-30-602-03745
/65- /

DOD-AIR FORCE

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JPI 1 FIELD 20M,11B,20L, 7B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CERAMIC ENGINEERING, ILLINOIS

ENTHALPY CHANGES ACCOMPANYING THE GROWTH AND DISSOLUTION OF CRYSTALS IN GLASSES

C. G. BERGERON, D. LABER

/65- /

PITTSBURGH PLATE GLASS COMPANY

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ZQA 23 FIELD 11B,11D,11F

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

HIGH TEMPERATURE VAPORIZATION

I. AHNAD

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 37 FIELD 11B,11D,11G,20L

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

FATIGUE-RUPTURE CHARACTERISTICS OF FIBER-GLASS THIN-WALLED CYLINDERS

T. DAVIDSON

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 152 FIELD 11B

USA, ORD CORPS, WATERTOWN ARSNL, MASSACHUSETTS

MICROSTRUCTURE STUDIES OF POLYCRYSTALLINE CERAMICSYSTEMS

A. TARPINIAN

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 153 FIELD 7D, 7A,11B, 7B

USA, ORD CORPS, WATERTOWN ARSNL, MASSACHUSETTS

GAS SOLUBILITY IN SOLID AND LIQUID CERAMIC

S. J. ACQUAVIVA

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 154 FIELD 11B

USA, ORD CORPS, WATERTOWN ARSNL, MASSACHUSETTS

STUDY OF VAPOR DEPOSITION AS A MEANS OF TAILORINGPROPERTIES OF CERAMICS

P. WONG

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 155 FIELD 11B

USA, ORD CORPS, WATERTOWN ARSNL, MASSACHUSETTS

INVESTIGATION OF HOT FORMING TECHNIQUES FOR CERAMIC MATERIALS

K. D. HOLMES

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 156 FIELD 11B

USA, ORD CORPS, WATERTOWN ARSNL, MASSACHUSETTS

CORRELATION OF MICROSTRUCTURE WITH MECHANICAL PROPERTIES OF PYROLYTIC GRAPHITE

R. N. KATZ

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 159 FIELD 11B,11G,11D,15G

USA, ORD CORPS, SPRINGFIELD ARM, MASSACHUSETTS

FIBER REINFORCED COMPOSITES

J. KWOLEK, J. SZANTO, A. ZAVARELLA

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 167 FIELD 20M,11B,11D,11F

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

HIGH TEMPERATURE STABILITY - DISPERSION HARDENED ALLOYS

F. SAUTTER

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 234 FIELD 11B,11C,11D

USA, ORD CORPS, WATERTOWN ARSNL, MASSACHUSETTS

INVESTIGATION OF STRENGTHENING MECHANISMS IN CERAMICS

A. TARPINIAN

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQF 284683 5 FIELD 11B,11G,12A,20H

USAF, AFSC, RTD, WRIGHT-PATT-AF MAT LAB, OHIO

FUNDAMENTAL PHYSICAL BEHAVIOR OF ELASTOMERS

F. S. OWENS

/65- /

DOD-AIR FORCE

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ZQF 284687 3 FIELD 11B,11H

USAF, AFSC, RTD, WRIGHT-PATT-AF MAT LAB, OHIO

FUNDAMENTAL FRICTION AND WEAR INVESTIGATIONS

T. LIU

/65- /

DOD-AIR FORCE

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ZQN 944133 1 FIELD 11B,11C

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

COATINGS FOR FLOATING DRYDOCK WORK AREA

C. V. BROUILLETTE, W. S. HAYNES

/65- /

DOD-NAVY

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ZQN 944154 FIELD 11B,11F,20K

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

LONG RANGE OBSERVATIONS --SALT WATER CONCRETE

D. F. GRIFFIN, S. L. BUGG

/65- /

DOD-NAVY

****

ZQN 944195 FIELD 13F,11B

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

MICRO-PROPERTIES OF ASPHALT

J. A. BISHOP, S. BUYG

/65- /

DOD-NAVY

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ZUG 872 FIELD 7D, 8D, 8G,11B

USDI, BUR MINES, TUSCALOOSA, ALABAMA

BENEFICIATION OF KYANITE ORES

F. J. CSERVENYAK, J. S. BROWNING

INT-BM-111471-6
/66- /

INTERIOR-BUREAU OF MINES

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GQF 1012 5 FIELD 11F,13H,11G,20L

PENNSYLVANIA ST UNIV, SCHOOL OF ENGINEERING, ENGINEERING MECHANICS, PENNSYLVANIA

EFFECTS OF TRIAXIAL STRESSES ON MECHANICAL PROPERTIES OF METALS UNDER HIGH PRESSURE

L. W. HU

AF-AFOSR-0127-65
/65- /

DOD-AIR FORCE

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GQF 3523 2 FIELD 11F,11G,20L

UNIV OF BIRMINGHAM, UNITED KINGDOM

STABILITY OF THE BODY CENTERED CUBIC STRUCTURE IN METALS AND ALLOYS

R. W. SMITH

AF-EOAR-0067-63
/65- /

DOD-AIR FORCE

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GQF 4516 FIELD 11F,11G

MELLON INST OF INDUS, PENNSYLVANIA

STACKING FAULTS IN FACE-CENTERED CUBIC ALLOY PHASES

L. F. VASSAMILLET

AF-AFOSR-0929-65
/65- /

DOD-AIR FORCE

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GQF 207508 FIELD 11F,11G

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

WORK HARDENING BEHAVIOR IN FCC METALS

J. ROBERTSON

/65- /

DOD-AIR FORCE

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GQF 207511 FIELD 7D, 7C,20M,11F

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

PHASE EQUILIBRIA STUDIES - THE BORON-SILICON AND IRON-NICKEL- OXYGEN SYSTEM

L. BIDWELL

/65- /

DOD-AIR FORCE

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GQF 258385 1 FIELD 11F,13H,11G, 5A

TUFTS UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

DETECT + INTERPRET OF RADIATION DAMAGE IN SOLIDS BY LOW TEMP ULTRA SONIC ATTENUATION + THERMAL MEAS

L. A. MCCARTHY

AF-19-628-04029
/65- /

DOD-AIR FORCE

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GSE 338 2 FIELD 20M,11F,11G,20C

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, PENNSYLVANIA

VACANCIES IN METALS

E. KOROSTOFF, C. BECKMAN
J. N. HOBSTETTER

NSF-GP-1063
3/65- 2/66

NSF-ENGINEERING SCIENCES DIVISION

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ZQA 28 FIELD 7C, 7D, 5A,11F

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

DIFFUSION OF CARBON IN IRON

C. HOMAN

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 29 FIELD 5A,11F,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

EXTREME PRESSURE EFFECTS ON PROPERTIES OA METALS AND ALLOYS

T. DAVIDSON

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 33 FIELD 7C, 7A, 7D,11F

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

SURFACE PROPERTIES AND BEHAVIOR OF MATERIALS

F. SAEGUSA

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 34 FIELD 11F,13H,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

SURFACE PROPERTIES AND BEHAVIOR OF MATERIALS

A. LIND

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 138 FIELD 11F,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

STRAIN RATE EFFECTS UPON YIELDING CHARACTERISTICS OF METALS

D. KENDALL

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 169 FIELD 11F,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

STRESS STATE DEPENDENCY OF FRACTURE MECHANISMS IN METALS

J. UY

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 170 FIELD 11F,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

STRESS AND STRAIN FIELDS IN THE REGION OF CRACKS IN METALS

D. KENDALL

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ZQA 173 FIELD 11F,11G,20L,20K

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

PRESSURE-TEMPERATURE PHASE EQUILIBRIA IN PURE METALS

T. DAVIDSON

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 174 FIELD 11F,13H,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

PRECIPITATION PHENOMENA IN IRON ALLOY SYSTEMS

L. MEISEL

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 178 FIELD 11F,13H,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

THE BAUSCHINGER EFFECT IN METALS

R. V. MILLIGAN, W. H. KOO

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 179 FIELD 11F,13H,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

STRESS AGING

R. HARRINGTON

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

12 MATHEMATICAL SCIENCES

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GQA 457 1 FIELD 12A

STANFORD UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

ANALYTIC DIFFERENTIABLE AND PSEUDOGROUP STRUCTURES

D. C. SPENCER

DA-31-124-ARO-D-151
/65- /

DOD-ARMY

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GQA 469 FIELD 12A, 5C

THE COMBINED USE OF MONTE CARLO PROCEDURES AND ANALYTIC APPROXIMATIONS IN STATISTICAL DISTRIBUTION PROBLEMS

H. O. HARTLEY

DA-31-124-ARO-D-282
/65- /

DOD-ARMY

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GQF 70 10 FIELD 12A,13M,20D

PARTIAL DIFFERENTIAL EQUATIONS

J. J. GERGEN

AF-AFOSR-0435-63
/65- /

DOD-AIR FORCE

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GQF 72 8 FIELD 12A

ALGEBRAIC LINEAR SYSTEMS

O. ZARISKI

AF-AFOSR-0442-63
/65- /

DOD-AIR FORCE

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GQF 81 8 FIELD 3C, 3A,12A

MASS INST OF TECHNOL, GRADUATE SCHOOL, MATHEMATICS, MASSACHUSETTS

ALGEBRA ABSTRACT VARIETIES AND POTENTIAL THEORY

W. T. MARTIN

AF-AFOSR-0335-63
/65- /

DOD-AIR FORCE

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GQF 3759 1 FIELD 22C,12A,20H,20J

NORTHWESTERN UNIV, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

DIFFERENTIAL GEOMETRY AND MATHEMATICAL PHYSICS

R. HERMANN

AF-AFOSR-0512-64
/65- /

DOD-AIR FORCE

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GQF 3781 1 FIELD 12A

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

PARTIAL DIFFERENTIAL EQUATIONS OPERATOR THEORY AND APPLICATIONS

M. H. PROTTER

AF-AFOSR-0553-64
/65- /

DOD-AIR FORCE

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GQF 3823 FIELD 9+,12A, 9D, 5C

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, MATHEMATICS, MICHIGAN

APPLICATIONS OF GRAPH THEORY

F. HARARY

AF-AFOSR-0754-65
/65- /

DOD-AIR FORCE

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GQF 3978 FIELD 12A, 9D

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, STATISTICS, NORTH CAROLINA

MATHEMATICAL STATISTICS

G. E. NICHOLSON, G. P. NICHOLSON

AF-AFOSR-0760-65
/65- /

DOD-AIR FORCE

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GQF 4430 FIELD 12A

UNIV OF MINNESOTA, GRADUATE SCHOOL, MATHEMATICS, MINNESOTA

PARTIAL DIFFERENTIAL EQUATIONS AND CALCULUS OF VARIATIONS

J. SERRIN

AF-AFOSR-0883-65
/65- /

DOD-AIR FORCE

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

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GQF 259034 1 FIELD 9+,20F

GENERAL ELECTRIC CO, SYRACUSE, NEW YORK

DESIGN BUILD + STUDY PROPS OF AN OPTICAL MATRIX PROCESSOR BASED ON USE OF THERMOPLASTIC FILM TECHNIQUE

G. J. CHAFARIS

AF-19-628-04199
/65- /

DOD-AIR FORCE

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GSE 780 FIELD 7A, 7D

UNIV OF MINNESOTA, SCHOOL OF PHARMACY, PHARMACEUTICAL SCIENCE, MINNESOTA

SEGREGATION KINETICS OF PARTICULATE SOLIDS SYSTEMS

E. G. RIPPIE

NSF-GK-471
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GYE 290162 FIELD 12A, 8E, 7B

RUTGERS THE STATE UNIV, AGRICULTURAL EXPT STA, METEOROLOGY, NEW JERSEY

THE RELATIONSHIPS BETWEEN THE CONCENTRATIONS OF CERTAIN AIR POLLUTANTS AND VARIOUS METEOROLOGICAL FACTORS

A. V. HAVENS

AG-NJ-0279
7/64- 6/65

AGRICULTURE-DEPT OF AGRICULTURE

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ZT 96 2 FIELD 13A, 4B

TENN VALLEY AUTHORITY, TENNESSEE

FULL-SCALE FIELD STUDY OF PLUME RISE AT LARGE ELECTRIC GENERATING STATIONS

F. E. GARTRELL, S. B. CARPENTER
F. W. THOMAS

TV-24649A
/66- /

TENNESSEE VALLEY AUTHORITY

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ZUG 875 FIELD 13A,13F, 7A, 7D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

CHARACTERISTICS AND PHOTOCHEMICAL REACTIVITY OF VEHICULAR EMISSIONS

B. DIMITRIADES, J. D. CLINGENPEEL
R. D. FLEMING, J. E. SHAFER

INT-BM-6-4211-1100
/66- /

INTERIOR-BUREAU OF MINES

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GUW 22 1 FIELD 13B, 8H

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, OHIO

A STUDY OF GROUNDWATER CONTAMINATION DUE TO SALINE WATER DISPOSAL IN THE MORROW COUNTY OIL FIELDS

J. H. LEHR

INT-WR-A-004-OHIO
1/66- 6/67

INTERIOR-OFFICE OF WATER RESOURCES

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ZUA 853 FIELD 13B, 8H

SEWAGE LAGOON STUDY

W. J. POWELL

INT-GS-ALA-22-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

••••••••••

ZYA 24445 FIELD 13B, 8H

USDA, DC, DIST OF COLUMBIA

SOIL WETTABILITY AND TREATMENT IN RELATION TO WATER MOVEMENT

C. E. HOLSCHER

AG-FS-01-06-040
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

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GT 33 1 FIELD 13G,20D

UNIVERSITY OF IOWA, SCHOOL OF ENGINEERING, MECHANICS + HYDRAULICS, IOWA

STUDIES OF HYDRAULIC FORCES ON HIGH HEAD GATES

. NONE

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/65- /

TENNESSEE VALLEY AUTHORITY

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GUM 414 FIELD 13G

KANSAS ST UNIV AGR SCI, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, KANSAS

A STUDY OF ENERGY DISSIPATION DEVICES TO CONTROL EROSION

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INTERIOR-OFFICE OF WATER RESOURCES

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ZQN 544220 2 FIELD 13J, 8H, 8+, 9+

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CHEMICAL SEALANTS TO REDUCE SEEPAGE IN WATER STORAGE AREAS

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INTERIOR-BUREAU OF MINES

14 METHODS AND EQUIPMENT

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16 MISSILE TECHNOLOGY

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PHYSICS OF SOLIDS

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PROPERTIES OF RARE-GAS SOLIDS

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INTERACTION OF MICROWAVES WITH MATTER

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